

## CHAPTER 4

### AIR AND OIL SERVICING AND MISSILE ELECTRICAL CHECKOUT

#### Section I. AIR AND OIL SERVICING THE ACCESSORY POWER SUPPLY (APS)

##### 4-1. General

The missile is shipped to the user with the APS fuel drained, the hydraulic system full, and the accumulator depressurized.

**WARNING:** Do not allow smoking within 60 feet of the working area. Although the fuel is drained from the APS fuel tank and the accumulator air charge is depressurized prior to shipment to the using organization, residual fuel vapors in the APS fuel tank are subject to a small buildup.

##### 4-2. Hydraulic Oil Low-Temperature Limitations.

Reliable operation of the APS at varying ambient temperatures requires that the viscosity of the hydraulic oil and the buzz voltage settings be maintained within the specific limits set in table 4-12. This paragraph describes the low-temperature limitations of the different types of hydraulic oil used in the APS with and without the winterization kit.

*a. With the Winterization Kit.* MIL-H-5606 hydraulic oil is used if the missile is continuously exposed to temperatures between 160°F and +30°F, or if the low temperature exposure of the missile is limited in accordance with table 4-12. Hydraulic oil MS-10137 will be used if the missile is continuously exposed to temperatures between 95°F and -10°F. MPD-2067 hydraulic oil will be used if the missile is continuously exposed to temperatures below 30°F.

*b. Without the Winterization Kit.* MIL-H-5606 hydraulic oil is used regardless of the

ambient temperature, and exposure of the missile to temperatures below 30°F is limited in accordance with table 4-12.

##### 4-3. Servicing and Test Equipment

The servicing and test equipment necessary to service and check the operation of the APS is listed below:

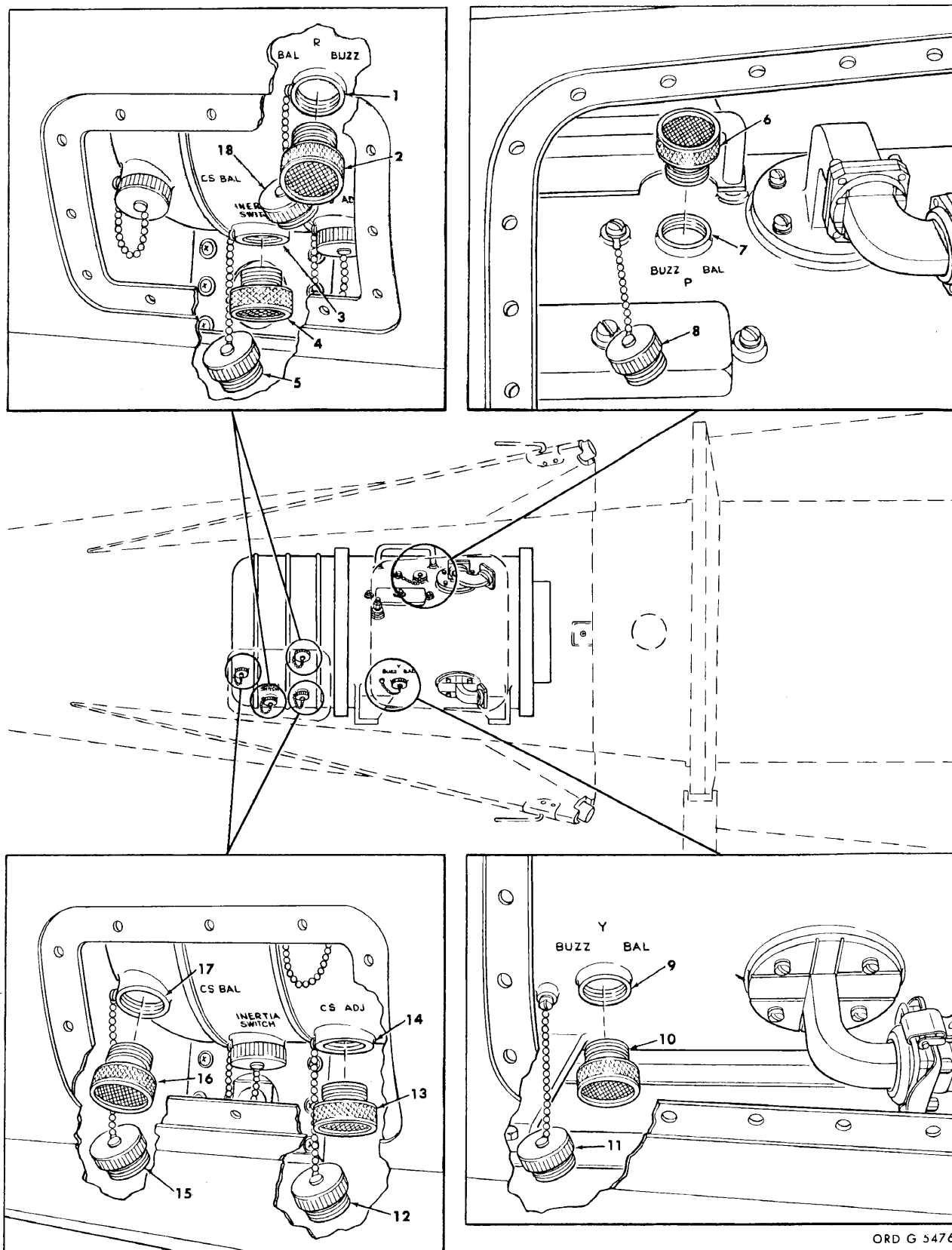
- a.* The missile electrical test set group.
- b.* Lubricating oil MS35900-273 and a syringe-type means of transferring the oil into the APS gear box.
- c.* A 3,500-psi source of clean, dry, compressed air, with a dew point of -40°F, or nitrogen.
- d.* The assembly area oil fill valve assembly used to adapt hydraulic test stand M14.
- e.* One 2-1/2-gallon (minimum) container and a hose for discharge of the oil from the overboard dump tube fitting on the APS.
- f.* Hydraulic oil, unopened can (minimum 3 gal).
- g.* Hygrometer.

##### 4-4. Preliminary Procedure for APS Servicing.

*Note.* The preliminary procedures in this paragraph include those for missile electrical checkout.

*a.* Connect a grounding strap with a maximum resistance of 20-ohms to the missile frame at a point where proper electrical contact can be made, and to a good earth ground.

*b.* Visually inspect the APS and all associated hydraulic lines and electrical connections. Make sure that the APS is securely mounted.



ORD G 5476

Figure 4-1. Removal and installation of the air filters (missiles 10206 through 11935).

- 1—R-BUZZ-BALL adjustment port
- 2—Air Filter 9020193
- 3—INERTIA SWITCH adjustment port
- 4—Air filter 9020193
- 5—Screw-type access plug
- 6—Air filter 9020193
- 7—P-BUZZ-BAL adjustment port
- 8—Screw-type access plug
- 9—Y-BUZZ-BAL adjustment port

- 10—Air filter 9020193
- 11—Screw-type access plug
- 12—Screw-type access plug
- 13—Air filter 9020361
- 14—CS ADJ adjustment port
- 15—Screw-type access plug
- 16—Air filter 9020361
- 17—CS BAL adjustment port
- 18—Screw-type access plug

*Figure 4-1. Removal and installation of air filtered missiles (10206 through 11935)—legend.*

*Note.* Illustrated tables of controls and indicators for the missile electrical test set group are contained in TM 9-4935-253-12.

c. Check that the AC POWER, HEATERS EXTERNAL, PLATE POWER EXTERNAL, and GLOW COIL switches on the test power control unit (TPCU) are set to OFF.

d. Set the TEST SELECTOR NO. 1 switch on the test control unit (TCU) to OFF and the TEST SELECTOR NO. 2 switch to TRANS. NO. 1.

e. Connect the ground power cable assembly (fig. 4-13) to connectors P104A and P105A on the missile umbilical cable, and to connector J7 on the rear of the missile electrical test set group.

f. Connect the missile test cable assembly to connector J2 on the transponder control group, and to connector J1 on the rear of the missile electrical test set group.

g. Connect a power cable assembly to connector J8 on the rear of the missile electrical test set group and to a 120-volt, 400— single-phase source of power.

*Note.* Perform h through n below for missile 10206 through 11935.

h. Remove the screw-type access plugs (18, 5, 8, and 11, fig. 4-1) from the R-BUZZ-BAL adjustment port (1), INERTIA SWITCH adjustment port (3), P-BUZZ-BAL adjustment port (7), and Y-BUZZ-BAL adjustment port (9); and install the air filters (2, 4, 6, and 10).

i. Remove the screw-type access plugs (12 and 15) from the CS ADJ adjustment port (14) and CS BAL adjustment port (17), and install the air filters (13 and 16).

j. Loosen the captive screws (1, fig. 4-2), and remove the cover plate (2).

k. Install the missile-code delay line (fig. 12-15).

l. Check that the gasket (3, fig. 4-2) is properly seated in the groove around the missile-code delay line access port (4).

m. Install the adapter plate (6) on the access port, and secure with the captive screws (5).

n. Install the hose coupling adapter (9) on the adapter plate (7), and secure it with the captive screws (8).

o. Install the air hose assembly (1, fig. 4-3) on the cooling unit (8).

p. Connect connector P1 (12) of the power cable assembly (9) to connector J1 (11) and to 120/208V, 3 phase, 400 cycle.

q. Connect the air hose assembly to the hose coupling adapter (2) or the hose assembly (5).

**CAUTION:** Check that the AC POWER switch on the test power control unit is set to OFF before connecting the cables.

**CAUTION:** The ground strap connected in a above must remain connected during missile electrical checkout.

r. Connect a power cable assembly (fig. 4-13) to the 120V-400— connector on the rear of the missile RF test set group and to a 102-volt, 400— power source.

s. Set the TEST SELECTOR switch on the RF test set to CAL, CALIBRATE switch to ADJ, and FAIL-SAFE TEST-CONTACT-NORMAL-TIME switch to NORMAL.

t. Set the AC POWER switch on the RF test set to ON.

u. After 60 seconds, momentarily operate the RESPONSE-250V switch on the RF test

set to 250V. If the RESPONSE OR VOLTAGE meter does not deflect to the right, immediately set the AC POWER switch to OFF.

v. Set the CALIBRATE switch to TEST, and allow at least a 30-minute warmup. Proceed with equipment and cable connections while the RF test set is warming up.

w. Connect test equipment as prescribed below.

(1) Remove the three stud assemblies (fig. 4-22) from the forward body section. Install antenna coupler test adapter 9139863 over forward fin assembly 3. Secure the adapter over the fin assembly by alining the three captive fasteners of the mounting brackets with the mating parts in the missile

skin of the forward body section, and rotate the fasteners to the locked position by hand.

(2) Install waveguide coupling (RF terminator) 9000245 (fig. 4-23) on transmitting antenna horn 1.

(3) Connect waveguide assembly 9138481 to receiving antenna horn 4.

(4) Connect waveguide assembly 9138342 to waveguide assembly 9138481 and to one RECEIVER ANTENNA Connector on the antenna coupler test adapter.

(5) Connect waveguide assembly 9138483 to receiving antenna horn 2.

(6) Connect waveguide assembly 9138341 to waveguide assembly 9138483 and to the other RECEIVER ANTENNA connector on the antenna coupler test adapter.

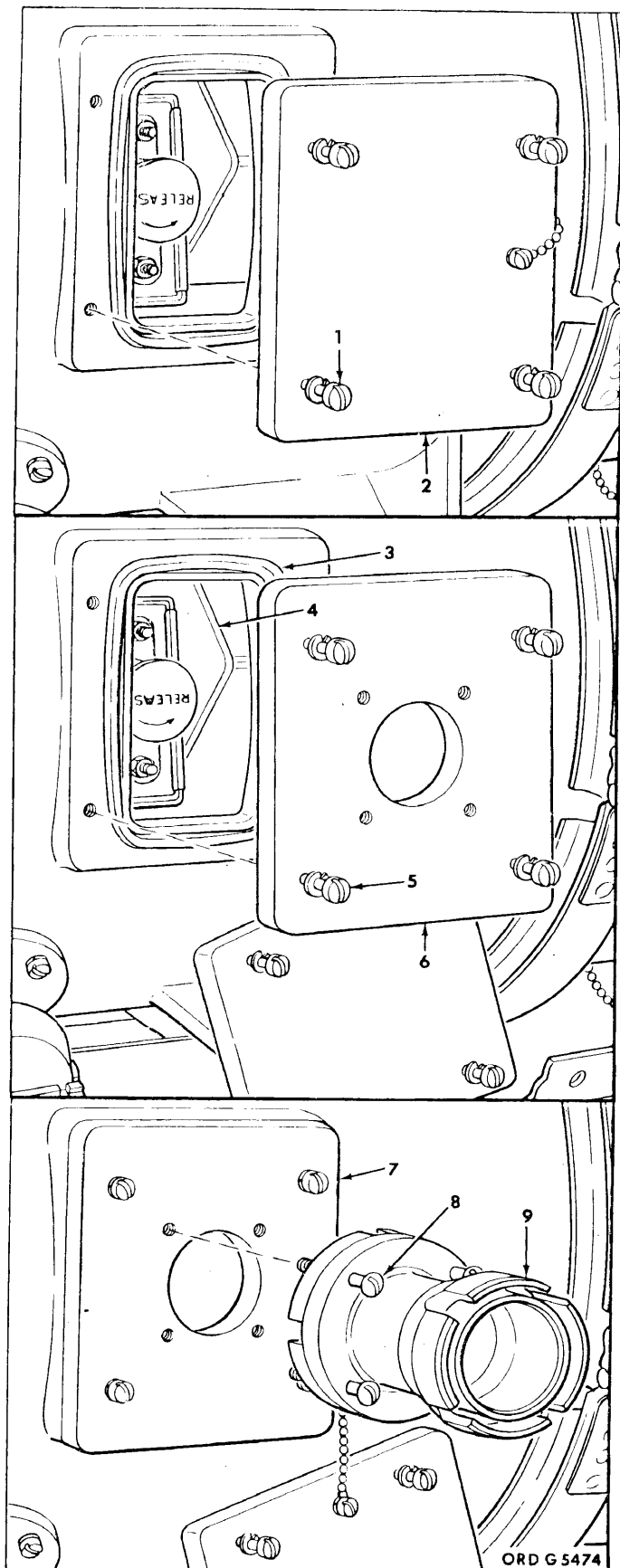


Figure 4-2. Removal and installation of the cover plate, adapter plate, and hose coupling adapter.

- 1—Captive screw (4)
- 2—Cover plate
- 3—Gasket
- 4—Missile-code delay line access port
- 5—Captive screw (4)
- 6—Adapter plate 9020197
- 7—Adapter plate 9020197
- 8—Captive screw (4)
- 9—Hose coupling adapter 9017764

Figure 4-2—Continued

(7) Connect waveguide assembly 9138482 to transmitting antenna horn 3.

(8) Connect waveguide assembly 9138340 to waveguide assembly 9138482 and to the TRANSMITTING ANTENNA connector on the antenna coupler test adapter.

(9) Connect waveguide assembly 9005430 to the RF TEST SET connector on the antenna coupler test adapter and to the waveguide connector (fig. 4-13) on the rear of the missile RF test set group.

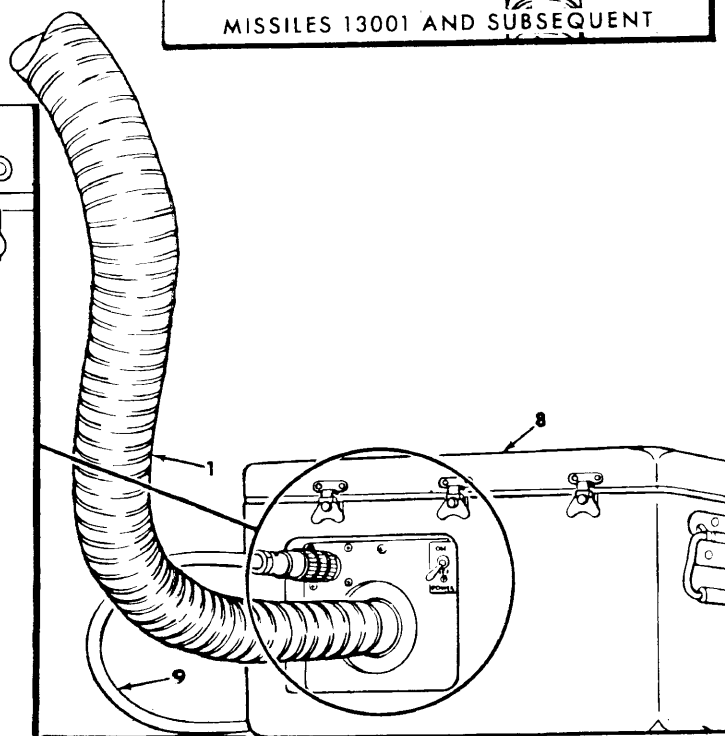
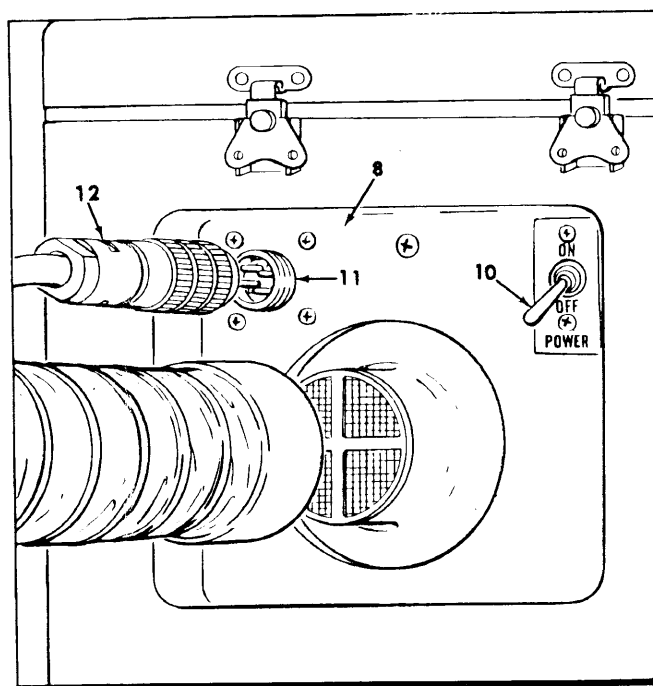
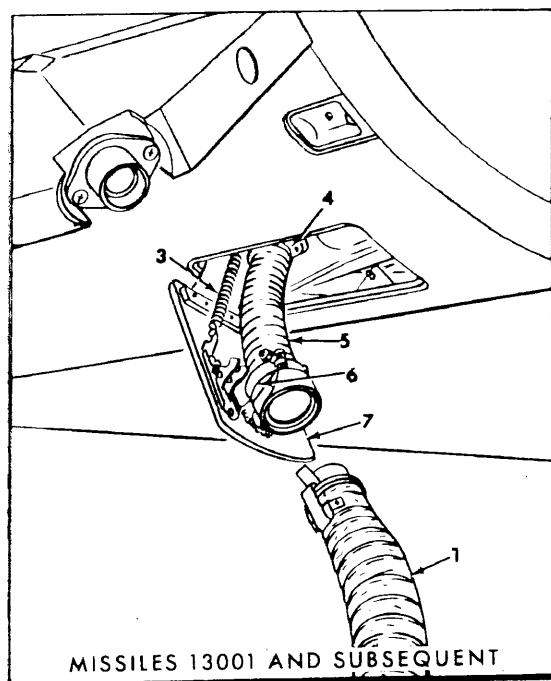
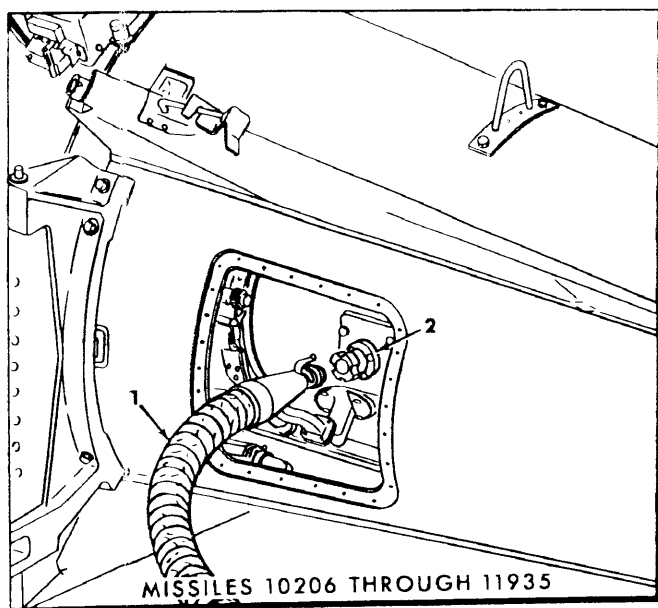
(10) Connect the switch attenuator cable assembly to connector J1 on the antenna coupler test adapter and to the WAVEGUIDE ASSEMBLY connector on the rear of the missile RF test set group.

(11) Connect the fail-safe test cable assembly (fig. 4-13) to connector J2 on the fail-safe control and to the FAIL-SAFE TEST connector on the rear of the missile RF test set group.

(12) Check that transponder control group wiring harness connector P1 (13, fig. 3-30 or 19, fig. 3-31) is connected to transponder control group connector J1 (15, fig. 3-30 or 16, fig. 3-31) in the forward body section.

*Note.* Perform step (13) below for missiles 10206 through 11935 and 13001 through 13683.

(13) Disconnect connector J510 on the battery wiring harness from connector P510 on the distribution box, if not previously disconnected, and connect the battery simulator cable assembly (fig. 4-13) from connector P510 on the missile distribution box



ORD G 5559

1—Air hose assembly  
2—Hose coupling adapter  
3—Spring (2)  
4—Screw (4)

5—Hose assembly  
6—Clamp  
7—Cooling access door  
8—Cooling unit

9—Power cable assembly  
10—POWER switch  
11—Connector J1  
12—Connector P1

Figure 4-3. Removal and installation of the cooling unit.

to connector J6 on the rear of the missile electrical test set group.

*Note.* Perform step (14) below for missile 13684 and subsequent.

(14) Connect the battery simulator cable assembly to connector P510 on the mounting panel and to connector J6 on the rear of the missile electrical test set group.

(15) Connect the power and continuity test cable assembly to connector J2 on the rear of the missile electrical test set group and to connector J183 on the missile distribution box.

(16) (Deleted)

(17) Remove the closures (6, fig. 3-31) from the four ram pressure probes (2, fig. 4-24). Install the adapter hose assembly (1) on one of the ram pressure probes, and install the plug hose assemblies (4) on the three remaining probes. Secure the adapter hose and plug hoses with the hose clamps (3).

*Note.* Perform *x* through *ag* below for missile 13001 and subsequent.

*x.* Rotate the mated forward and rear body sections so that the forward body section is in the flight position (B, fig. 4-28).

*y.* Remove the hexagon-head bolt (11, fig. 3-29) and flat washer (10) that secure the left side of the forward body section (8) to the testing fixture (5).

**WARNING:** Insure that the self-locking pins (view A, fig. 9-1) are inserted through the handling ring segment prior to performing *z* below.

*z.* Swing the forward body section to the right until the hinge lock pin (12, fig. 3-29) snaps into the locked position.

*aa.* Loosen the six captive screws that secure the access cover plate to the transponder control group sufficiently to insure depletion of air pressure.

**Warning:** Potentials of 4,000 volts exist on the megnetron connector shell and under the radio transmitter cover. Be careful not to contact high-voltage components.

**CAUTION:** Do not remove the rear housing cover (10, fig. 12-2) unless the forward body section is swung fully open and the hinge lock pin (12, fig. 3-29) is locked in position.

*ab.* Remove the rear housing cover from the transponder control group (1, fig. 12-2) as prescribed in steps (1) and (2) below.

(1) Loosen the retaining screw (11), and disengage the lever arm (12).

(2) Exert a steady pull on the two hook handles (23), and remove the rear housing cover from the transponder control group.

*ac.* Install the missile-code delay line (5, fig. 12-3) in the transponder control group (1).

*ad.* Insure that the missile code delay line is fully seated, and insure that the locking tab on the missile code-delay line will not move clockwise sufficiently to clear the locking slot.

*ad.1.* Using a screwdriver, insure that all captive screws securing plug-in components or modules are properly tightened.

*ad.2.* Insure a positive mechanical mating of connectors P1 and J1, P1 and J8, and P2 and J2 (4, 22, and 23, fig. 12-6).

*ae.* Install the rear housing cover on the transponder control group as prescribed in steps (1) and (6) below.

**CAUTION:** Do not use any type of tool on the rear housing cover to assist seating. Support the forward body section while installing the rear housing cover.

(1) (Deleted)

(2) With the pressure valve (7, fig. 12-2) on the right, seat the rear housing cover on the transponder control group until the retaining ring (14) is approximately flush with the rim of the housing.

(3) Apply pressure to the right hook handle while maintaining a retaining pressure on the left hook handle. When the rear housing cover has seated on the right side, hold a retaining pressure on the right hook handle, and increase pressure on the left hook handle until the rear housing cover seats on the left side.

(4) Press firmly on all sides of the rear housing cover and on each side of the lever arm to insure proper seating.

**CAUTION:** Do not force the lever arm which should close freely to approximately three-eighths of an inch. If force is required to engage the lever arm, the rear housing cover is not seated properly.

(5) Engage the lever arm (12), and tighten the retaining screw (11) to secure the rear housing cover (10) to the transponder control group.

(6) Inspect the entire retaining ring (14) for proper seating.

**CAUTION:** Lift and support the forward body section while installing and tightening the hexagon-head bolt in *af* below.

*af.* Swing the forward body section to the left until the hinge lock pin (12, fig. 3-29) snaps into the locked position. Install the hexagon-head bolt (11) and the flat washer (10) that secure the left side of the forward body section (8) to the testing fixture (5).

*af.1.* Rotate the missile body to the normal flight position.

*ag.* Insure that the cooling unit is connected.

#### 4-5. APS Lubrication

**CAUTION:** The APS turbine gear box must be lubricated prior to operation and after every hour of cumulative run time, whether operated by the external drive motor or with fuel (ET<sub>0</sub>).

*Note.* Insure that the rear body section is in the normal flight position.

*a.* Remove the oil fill plug (fig. 4-4) and oil drain plug from the turbine gear box. Check for oil drainage from the oil drain plug port. If there is oil drainage, allow the excess to drain, and omit *b* below.

*b.* Fill the turbine gear box with lubricating oil MS35900-273 through the oil fill port until the oil begins to drain out of the oil drain port.

*c.* Inspect the preformed packings on the oil fill plug and oil drain plug, and, if damaged, remove the packings, and install new packings. Install the oil fill plug and oil drain plug on the turbine gear box.

#### 4-6. Arm Safety Check

*Note.* Illustrated tables of the controls and indicators for the missile electrical test set group are contained in TM 9-4935-253-12.

*a.* Check that the AC POWER switch on the TPCU is set to OFF.

*b.* Check that the GLOW COIL switch is set to OFF.

*c.* Depress the arm SAFETY SWITCH (fig. 4-6) on the APS service panel to the limit of its travel (view A, step 1), and allow the switch to return to the center safe position (view A, step 2).

#### 4-7. Glow Plug Continuity Check

*Note.* Perform *a* through *g* below for APS 9030900.

*a.* Disconnect connector P9 (fig. 4-5) from connector J9 on the APS service panel.

*b.* Using a multimeter, set to R X 1, check the resistance between pins 2 and 3 of connector P9. The multimeter should indicate 8 to 14 ohms.

*c.* Use the multimeter to check the resistance between pins 4 and 5 of connector J9. The multimeter should indicate infinity. Check the resistance between pins 6 and 7 of J9. The multimeter should indicate infinity.

*d.* Set the arm SAFETY SWITCH (view A, step 3, fig. 4-6) to the maintenance (fully out) position. Use the multimeter to check the resistance between pins 4 and 5 of connector J9. The multimeter should indicate 0. Check the resistance between pins 6 and 7 of J9. The multimeter should indicate 0.

*e.* Repeat step *d* above with the arm SAFETY SWITCH in the armed (fully depressed) position.

*f.* Set the arm SAFETY SWITCH to the center (safe) position.

*g.* Connect connector P9 (fig. 4-5) to connector J9, and check that the entire width of the orange band is visible after the connection is made.



Note. Perform *h* below for APS 9032190.

- h. Use a multimeter with the RANGE knob set to R X 1 to check the resistance between the

terminals of the glow plug at the gas generator on the APS. The multimeter should indicate 8 to 14 ohms.

Table 4-1. Initial Air Fill of the Accessory Power Supply (APS)

Step	Operation	Normal indication	Corrective Procedure
	<p>Note. Use clean, dry, compressed air, with a dewpoint of <math>-40^{\circ}\text{F}</math> and a maximum pressure of 3500 psi, or use nitrogen.</p> <p><b>Warning:</b> Weight the air supply hose with sand bags, and secure it to the missile body truck. Assure that the air fill valve on the end of the air supply hose is fully closed.</p> <p>Note. The arm safety check in paragraph 4-6 must be performed before performing step 1.</p>		
1.	Set the AC POWER switch on the TPCU to ON.	The POWER ON indicator light illuminates.	
1.1	Loosen the six captive screws that secure the access cover plate to the TCG sufficiently to ensure depletion of the air pressure. Remove the cover plate and allow it to hang by the chain.		
	<p><b>Caution:</b> Check that the weights of the INERTIA SWITCHES in the TCG are in the forward (dearmed) position.</p>		
2.	Set the POWER switch on the TCU to ON.	The POWER LIGHT illuminates.	
	<p><b>Caution:</b> If the GYRO UNCAGE indicator light illuminates, immediately operate the GYRO switch to CAGE.</p>		
3.	Set the HEATERS EXTERNAL switch to ON.	The HEATERS EXTERNAL indicator light illuminates.	
4.	Operate the AUXILIARY POWER SUPPLY switch to START and hold for a minimum of 1 second and a maximum of 2 seconds.		
5.	Set the HEATERS EXTERNAL switch to OFF.	The HEATERS EXTERNAL indicator light extinguishes.	
6.	At the TCU, set the POWER switch to OFF.	The POWER LIGHT extinguishes.	
7.	At the TPCU, set the AC POWER switch to OFF.	The POWER ON indicator light extinguishes.	
8.	Remove the AIR FILL fitting cap from the AIR FILL fitting on the APS service panel.		
9.	Connect the air supply hose from the air supply to the AIR FILL fitting.		
10.	Open the air supply shutoff valve.		
11.	Open the AIR FILL fitting by turning the AIR FILL fitting locknut counterclockwise.		
12.	Slowly open the air valve on the air supply hose until pressurization starts.		
13.	Depress and hold the TRANSFER valve until the APS is pressurized to the ambient temperature $\pm 25^{\circ}\text{F}$ as indicated on the upper scale of the ACC. AIR PRESS. gage.	Ambient temperature $\pm 25^{\circ}\text{F}$ on the ACC. AIR PRESS. gage.	
	<p>If the accumulator does not fill, or will only partially fill, loosen the locknut until pressurization is obtained.</p>		
14.	Simultaneously turn the AIR FILL fitting locknut fully clockwise, and close the air fill valve.		
15.	Allow the ACC. AIR PRESS. gage indication to stabilize.		
	<p>Repeat steps 11 through 14 above as necessary to obtain a stable pressure indication of ambient temperature <math>\pm 25^{\circ}\text{F}</math>.</p>		

Table 4-1. Initial Air Fill of the Accessory Power Supply (APS) — Continued

Step	Operation	Normal indication	Corrective Procedure
16.	Close the air supply shutoff valve.		
17.	Open the valve on the air supply hose to bleed the pressure.		
	<b>Warning:</b> Make certain that all pressure is bled from the hose before performing step 18.		
18.	Disconnect the air supply hose and install the AIR FILL fitting cap on the AIR FILL fitting. Torque the AIR FILL fitting locknut to 50 pound-inches.		

Table 4-2. Hydraulic Oil Fill and System Cleanup of the Accessory Power Supply, using the Portable Oil Fill and Filter Unit

Step	Operation	Normal indication	Corrective Procedure
	<b>Caution:</b> The initial air fill of the APS must be completed as prescribed in table 4-1 before performing the procedures below.		
	<b>Caution:</b> The oil drained from the APS must not be reused.		
1.	Unscrew the external drive motor spline cap (7, fig. 4-8).		
2.	Unscrew the turbine shaft cap (6) and remove the gasket (5).		
3.	Replace the gasket if it has nicks and compressed areas.		
4.	Install the gasket, and screw the turbine shaft cap on the external drive motor spline cap to protect both caps.		
5.	Connect the power cable assembly (fig. 4-9) to the power connector (8, fig. 4-8) on the external drive motor (1) and to a 208-volt, 400~, 3-phase power source.		
6.	Set the external drive motor switch (fig. 4-9) to ON, and check for counterclockwise rotation of the shaft (viewed from the power connector side).		
7.	Set the external drive motor switch to OFF, and disconnect the power cable assembly.		
8.	Insure that the external drive motor spline (2, fig. 4-8) and the turbine shaft (3) are clean and free of foreign matter.		
9.	Aline and engage the external drive motor spline with the turbine shaft, engage the threads on the external drive motor with the threads on the turbine housing (4), and rotate the external drive motor clockwise to secure in position. Back the motor off approximately one-quarter turn.		
	<b>Warning:</b> Assure that the external drive motor switch is set to OFF.		
10.	Connect the power cable assembly to the power connector on the external drive motor.		
11.	Remove the reservoir filler cap (11, fig. 4-10) on the portable oil fill and filter unit (10), and fill the reservoir with hydraulic oil until the oil level gage (9) indicates FULL. Replace the reservoir filler cap.		
12.	Connect the portable oil and filter unit power cable assembly (8) to POWER connector J1 (14) on the portable oil fill and filter unit.		
	<b>Caution:</b> Make certain that the OPERATE circuit breaker (2) on the portable oil fill and filter unit is set to OFF before performing steps 13 through 16 below.		
13.	Connect the other end of the power cable assembly to a 208-volt, 400~, 3-phase power source.		
	<b>The LINE POWER indicator light (1) on the portable oil fill and filter unit illuminates.</b>		
14.	Connect the hydraulic oil supply hose (7) to the quick-disconnect fitting on the manifold return port (12).		

Table 4-2. Hydraulic Oil Fill and System Cleanup of the Accessory Power Supply,  
using the Portable Oil Fill and Filter Unit — Continued

Step	Operation	Normal indication	Corrective Procedure
15.	Turn the BYPASS valve (4) fully counterclockwise.		
16.	Turn the RELIEF VALVE knob (3) fully counterclockwise.		
	<b>Caution:</b> When the OPERATE circuit breaker is set to ON, check for a pressure indication on the OIL PRESSURE gage. If there is no pressure indication, immediately set the OPERATE circuit breaker to OFF; verify correct power phasing and perform corrective maintenance procedures.		
17.	Set the OPERATE circuit breaker to ON.		
	<i>Note.</i> When performing step 18 below, monitor the OIL PRESSURE gage (5) indication. If the indication exceeds 100 psi, refer the portable oil fill and filter unit to the direct support unit for primary filter replacement.		
18.	Allow the portable oil fill and filter unit to operate for 30 minutes. Set the OPERATE circuit breaker to OFF.		
	<i>Note.</i> The system cleanup is to be performed during assembly, annually, and whenever major repair or replacement of the hydraulic system is accomplished.		
19.	Disconnect the hydraulic oil supply hose from the quick-disconnect fitting on the manifold return port.		
	<i>Note.</i> Check the spring action of the HYD. RES. LEVEL indicator on the APS service panel to be certain it is operating properly.		

*Table 4-2. Hydraulic Oil Fill and System Cleanup of the Accessory Power Supply,  
Using the Portable Oil Fill and Filter Unit—Continued*

<i>Step</i>	<i>Operation</i>	<i>Normal indication</i>	<i>Corrective procedure</i>
20	Remove the right equipment section cover plate (2, fig. 3-21), if not previously removed.		
21	Connect the hydraulic oil supply hose to the OIL FILL fitting (fig. 4-11) on the APS service panel.		
22	Remove the overboard dump tube from the oil bleed port on the APS. Connect the flexible hose assembly to the oil bleed port, and place the other end of the hose into a 2-1/2-gallon (minimum) container.		
23	Set the external drive motor switch to ON. When the ACC. AIR PRESS. gage indicates 2,500 to 3,000 psi, set the external drive motor switch to OFF.		
24	Open the OIL BLEED valve, and drain the oil into the container. When the oil flow stops, depress and hold TRANSFER valve until the oil flow ceases.		
25	Set the OPERATE circuit breaker (2, fig. 4-10) on the portable oil fill and filter unit to ON.		
26	Turn the BYPASS valve fully clockwise, and close the OIL BLEED valve when the oil stream is free of air bubbles.		
27	Turn the RELIEF VALVE knob until the OIL PRESSURE gage indicates $150 \pm 10$ psi, and turn the locknut fully clockwise.		
28	Set the OPERATE circuit breaker to OFF when the HYD RES LEVEL indicator moves into the BLD position.		
29	Turn the BYPASS VALVE and RELIEF VALVE knob fully counterclockwise. <b>CAUTION:</b> If the cooling unit is not used in the procedures below, insure that operation of the TCG is limited to cycles, not to exceed those prescribed in tables 4-7, 4-8, and 4-9.		
30	At the TPCU, set the AC POWER switch to ON. <b>POWER ON</b> indicator light illuminates.		
31	At the TCU, set the POWER switch ON. <b>POWER LIGHT</b> illuminates. <b>CAUTION:</b> Check that the weights of the INERTIA SWITCHES in the TCG are in the forward position.		
32	Set the POWER switch on the cooling unit to ON. <b>CAUTION:</b> If the GYRO UNCAGED indicator light illuminates, immediately operate GYRO switch to CAGE.		
33	Set HEATERS EXTERNAL and PLATE POWER EXTERNAL switches on the TPCU to ON. <b>The HEATERS EXTERNAL indicator light illuminates. After approximately 30 seconds, the PLATE POWER EXTERNAL indicator light illuminates.</b> <b>WARNING:</b> Insure that all personnel remain clear of the area surrounding the missile elevons while applying hydraulic pressure. <b>CAUTION:</b> The external drive motor must not be operated continuously for more than 20 minutes. The APS oil must be allowed to cool for a minimum of 30 minutes between runs.		
34	Set the external drive motor switch to ON. <b>The ACC. AIR PRESS. gage indicates 2,500 to 3,000 psi.</b>		

*Table 4-2. Hydraulic Oil Fill and System Cleanup of the Accessory Power Supply,  
Using the Portable Oil Fill and Filter Unit—Continued*

<i>Step</i>	<i>Operation</i>	<i>Normal indication</i>	<i>Corrective procedure</i>
35	Set the ROLL POSITION switch on the TCU to GROUND.		
36	Set the TEST SELECTOR NO. 1 switch to BUZZ. V, and depress the ROLL pushbutton.		
		<b>The NULL METER indicates within the white zone.</b>	Adjust the R-BUZZ variable resistor (D, fig. 4-25 or A, fig. 4-26) in the TCG until the NULL METER indicates 1.
37	Depress the YAW pushbutton.		
		<b>The NULL METER indicates within the white zone.</b>	Adjust the Y-BUZZ variable resistor (D, fig. 4-25 or A, fig. 4-26) in the TCG until the NULL METER indicates 1.
38	Depress the PITCH pushbutton.		
		<b>The NULL METER indicates within the white zone.</b>	Adjust the P-BUZZ variable resistor (A, fig. 4-25 or A, fig. 4-26) in the TCG until the NULL METER indicates 1.
39	Set the ROLL POSITION switch to NORMAL.		
40	Set the TEST SELECTOR NO. 1 switch to TRANS. NO. 2.		
	<i>Note.</i> From the rear of the missile, the trailing edges of the Y elevons deflect to the left when the YAW pushbutton is depressed and the TEST SELECTOR NO. 2 switch is set to +G, and to the right when the YAW pushbutton is depressed and the TEST SELECTOR NO. 2 is set to -G. The trailing edges of the P elevons deflect to the right when the PITCH pushbutton is depressed and the TEST SELECTOR NO. 2 switch is set to -G.		
41	Depress the YAW pushbutton, and alternately rotate the TEST SELECTOR NO. 2 switch between +G and -G for approximately 1 minute.		
		<b>The elevons deflect accordingly.</b>	
42	Depress the PITCH pushbutton, and alternately rotate the TEST SELECTOR NO. 2 switch between +G and -G for approximately 1 minute.		
		<b>The elevons deflect accordingly.</b>	
43	Set the TEST SELECTOR NO. 2 switch to TRANS. NO. 1, the TEST SELECTOR NO. 1 switch to GYRO PRESET, and the PRESET-FLIGHT switch to FLIGHT.		
44	Depress the ROLL pushbutton.		
45	Operate the GYRO PRESET switch to CW or CCW for approximately 1 minute.		
		<b>The elevons and NULL METER deflect accordingly, and the ACC. AIR PRESS. gage indicates 2,500 to 3,000 psi.</b>	
46	Set the PLATE POWER EXTERNAL switch on the TPCU to OFF.		
		<b>The PLATE POWER EXTERNAL indicator light extinguishes.</b>	

Table 4-2. Hydraulic Oil Fill and System Cleanup of the Accessory Power Supply,  
Using the Portable Oil Fill and Filter Unit—Continued

Step	Operation	Normal indication	Corrective procedure
47	Set the HEATERS EXTERNAL switch to OFF.	The HEATERS EXTERNAL indicator light extinguishes.	
48	Set the POWER switch on the cooling unit to OFF.		
49	Depress and hold the TRANSFER valve until the ACC. AIR PRESS. gage indicates down to 2,500 psi. Repeat 4 times.		
50	Set the external drive motor switch to OFF.		
51	Open the OIL BLEED valve, and bleed all the oil from the APS.	The HYD. RES. LEVEL indicator moves to -45°.	
52	Depress and hold the TRANSFER valve until oil flow stops.		
53	Repeat steps 25 through 29, 32 through 34, and 40 through 52, eight times.		
54	Attach the quick-disconnect coupling half (fig. 4-11) to the free end of the hydraulic oil supply flexible hose (6, fig. 4-10) and connect this end to the quick-disconnect fitting on the manifold return port (12) in the portable oil fill and filter unit.		
	<i>Note.</i> If oil is visible in the oil level gage (9), sufficient oil is available for the remainder of the clean-up procedure.		
55	Insure that the OIL BLEED valve is open.		
56	Insure that the RELIEF knob and BYPASS valve are fully counterclockwise. Set the OPERATE circuit breaker to ON and allow the oil to circulate for 5 minutes.		
57	Set the OPERATE circuit breaker to OFF. Set the external drive motor switch to ON. When the ACC. AIR PRESS. gage indicates 2,500 to 3,000 psi, set the external drive motor switch to OFF. Depress the TRANSFER valve, and hold until the ACC. AIR PRESS. gage indicator ceases to move.		
58	Close the OIL BLEED valve.		
59	Set the OPERATE circuit breaker to ON.		
60	Turn the BYPASS valve fully clockwise.		
	<b>CAUTION:</b> Do not allow the OIL PRESSURE gage indication to exceed 160 psi in step 61 below.		
61	Turn the RELIEF VALVE knob until the OIL PRESSURE gage indicates $150 \pm 10$ psi, and turn the locknut fully clockwise.		
62	Set the OPERATE circuit breaker to OFF when the HYD. RES. LEVEL indicator moves into the BLD position.		
	<b>CAUTION:</b> When performing step 63, do not allow the ACC. AIR PRESS. gage indication to fall below 2,500 psi.		
63	Set the external drive motor switch to ON. When the ACC. AIR PRESS. gage indicates 2,500 to 3,000 psi, depress the TRANSFER valve until the ACC. AIR PRESS. gage indicates 2,500 psi. Repeat this cycling of the TRANSFER valve for 30 seconds.		
64	Set the external drive motor switch to OFF.		
65	Open the OIL BLEED valve, and allow the oil to drain into the portable oil fill and filter unit reservoir. Depress the TRANSFER valve, and hold it until the indication on the ACC. AIR PRESS. gage ceases to move.		
66	Repeat steps 56 through 65 five times.		
67	Close the OIL BLEED valve.		
68	Turn the RELIEF VALVE knob fully counterclockwise.		
69	Repeat steps 25, 27 through 29, 32 through 34, 40 through 50, and 65.		
70	Repeat steps 55 through 65 six times.		

Table 4-2. Hydraulic Oil Fill and System Cleanup of the Accessory Power Supply,  
Using the Portable Oil Fill and Filter Unit—Continued

Step	Operation	Normal indication	Corrective procedure
71	Repeat steps 67, 68, 25, 27 through 29, 32 through 34, 40 through 50, and 65.		
72	Repeat steps 55 through 65 six times.		
73	Repeat steps 67, 68, 25, 27 through 29, 32 through 34, 40 through 50, and 65.		
74	Repeat 55 through 65 six times.		
75	Repeat steps 67, 68, 25, 27 through 29, 32 through 34, 40 through 50, and 65.		
76	Repeat steps 55 through 65 six times.		
77	Repeat steps 67, 68, 25, 27 through 29, 32 through 34, 40 through 50, and 65.		
78	Repeat 55 through 65 six times.		
79	Insure that the OIL BLEED valve is closed, the BYPASS valve is fully clockwise, and the RELIEF VALVE knob is fully counterclockwise.		
80	Set the OPERATE circuit breaker on the portable oil fill and filter unit to ON. <b>CAUTION: Do not allow the OIL PRESSURE gage indication to exceed 160 psi in step 81 below.</b>		
81	Turn the RELIEF VALVE knob until the OIL PRESSURE gage indicates $150 \pm 10$ psi, and turn the locknut fully clockwise.		
82	Set the OPERATE circuit breaker to OFF when the HYD. RES. LEVEL indicator moves into the BLD position.		
83	Set the HEATERS EXTERNAL switch to ON. <b>The HEATERS EXTERNAL light illuminates.</b>		
84	Operate the AUXILIARY POWER SUPPLY switch on the TPCU to STOP, and hold it for a minimum of 1 second and a maximum of 2 seconds.		
85	Set the HEATERS EXTERNAL switch to OFF. <b>The HEATERS EXTERNAL light extinguishes.</b>		
86	Set the AC POWER switch on the TPCU and the POWER switch on the TCU to OFF. <b>The POWER ON indicator light on the TPCU extinguishes. The POWER LIGHT on the TCU extinguishes.</b>		
87	Set the external drive motor switch to on. <b>When the ACC. AIR PRESS. gage reaches maximum pressure between 2,500 and 3,000 psi, immediately set the external drive motor switch to OFF.</b>		<p>If the ACC. AIR PRESS. gage indication exceeds 3,000 psi, perform the following corrective procedures.</p> <ol style="list-style-type: none"> <li>(1) Set the AC POWER switch on the TPCU to ON.</li> <li>(2) Set the POWER switch on the cooling unit to ON.</li> </ol> <p><b>CAUTION: If the GYRO UNCAGE indicator light illuminates, immediately operate the GYRO switch to CAGE.</b></p>

Table 4-2. Hydraulic Oil Fill and System Cleanup of the Accessory Power Supply,  
Using the Portable Oil Fill and Filter Unit—Continued

Step	Operation	Normal indication	Corrective procedure
87 Cont			<p>(3) Set the HEATERS EXTERNAL and the PLATE POWER EXTERNAL switches to ON.</p> <p>(4) Operate the AUXILIARY POWER SUPPLY switch to START, and hold for a minimum of 1 second and a maximum of 2 seconds.</p> <p>(5) Depress and hold the TRANSFER valve until oil flow stops. Allow the ACC. AIR PRESS. gage indication to decrease to the ambient temperature.</p> <p>(6) Operate the AUXILIARY POWER SUPPLY switch to STOP, and hold for a minimum of 1 second and a maximum of 2 seconds.</p> <p>(7) Set the PLATE POWER EXTERNAL switch to OFF.</p> <p>(8) Set the HEATERS EXTERNAL switch to OFF.</p> <p>(9) Set the POWER switch on the cooling unit to OFF.</p> <p>(10) Set the AC POWER switch on the TPCU to OFF.</p> <p>(11) Repeat step 87.</p>
88	Disconnect the flexible line from the manifold return port on the portable oil fill and filter unit.		
89	Remove the quick-disconnect fitting from the free end of the flexible line, and place the end of the line in a 2-1/2-gallon (minimum) container.		
90	If necessary, slowly open the OIL BLEED valve, and, when the HYD. RES. LEVEL indicator moves to a position midway between 100° and 165°, close the BLEED valve.		
91	Remove the external drive motor from the APS, and install the turbine cap. Torque the cap to a value of 60 pound-inches if the missile electrical checkout is not to follow.		



*Table 4-2. Hydraulic Oil Fill and System Cleanup of the Accessory Power Supply,  
Using the Portable Oil Fill and Filter Unit—Continued*

Step	Operation	Normal indication	Corrective procedure
92	Disconnect the hydraulic oil supply hose from the OIL FILL valve, and connect it to the quick-disconnect fitting on the manifold return port.		
93	Disconnect the flexible hose assembly from the oil bleed port on the APS.		
94	Install the overboard dump tube on the oil bleed port.		

*Table 4-3. Hydraulic Oil Fill and System Bleed of the Accessory Power Supply,  
Using Hydraulic Test Stand M14*

Step	Operation	Normal indication	Corrective procedure
	<i>Note.</i> These procedures will be used only by units which have not been issued a portable oil fill and filter unit.		
	<b>CAUTION:</b> The initial air fill of the APS must be completed as prescribed in table 4-1 before performing the procedure below.		
1	Unscrew the external drive motor spline cap (7, fig. 4-8).		
2	Unscrew the turbine shaft cap (6), and remove the gasket (5).		
3	Replace the gasket if it has nicks and compressed areas.		
4	Install the gasket, and screw the turbine shaft cap on the external drive motor spline to protect both caps.		
5	Connect the power cable assembly (fig. 4-9) to the power connector (8, fig. 4-8) on the external drive motor (1) and to a 208-volt, 400~, 3-phase power source.		
6	Set the external drive motor switch (fig. 4-9) to ON, and check for counterclockwise rotation of the shaft (viewed from the power connector side).		
7	Set the external motor switch to OFF, and disconnect the power cable assembly.		
8	Insure that the external drive motor spline (2, fig. 4-8) and the turbine shaft (3) are clean and free of foreign matter.		
9	Aline and engage the external drive motor spline with the turbine shaft; engage the threads on the external drive motor with the threads on the turbine housing (4); and rotate the external motor clockwise to secure in position. Back the motor approximately 1/4 turn.		
	<b>WARNING:</b> Check that the external drive motor switch is set to OFF.		
10	Connect the power cable assembly to the power connector on the external drive motor.		
11	Install the bayonet fitting (A, fig. 4-11), on the end of the hydraulic test stand oil supply hose, to the oil fill valve.		
12	Connect the strap on the oil fill valve to the bayonet fitting on the hydraulic test stand oil supply hose, and secure with hexagon-head cap screw (B, fig. 4-11) and lock-washer.		
	<i>Note.</i> Check the spring action of the HYD. RES. LEVEL indicator to be certain that it is operating properly.		
	<i>Note.</i> Inspect the hydraulic lines for damage and the hose connection for tightness.		
13	Depress the START switch on the hydraulic test stand (fig. 4-12).		
14	Turn the BY-PASS VALVE knob on the hydraulic test stand fully clockwise.		
15	Turn the knob on the oil fill valve fully counterclockwise.		
16	Cover the quick-disconnect fitting (C, fig. 4-11) on the hydraulic oil supply hose with cloth or other suitable material to prevent spraying of hydraulic oil on operating personnel. Hold the end of the hose over a 1-1/2-gallon (minimum) container (fig. 4-12),		

*Table 4-3. Hydraulic Oil Fill and System of the Accessory Power Supply,  
Using Hydraulic Test Stand M14—Continued*

Step	Operation	Normal indication	Corrective procedure
16	and crack the coupling nut (fig. 4-11) at the quick-disconnect fitting. Observe the flow of oil. When the flow is free of air bubbles and only a stream of clear oil is visible, tighten the coupling nut.		
17	Turn the knob on the oil fill valve fully clockwise.		
18	Turn the BY-PASS knob on the hydraulic test stand fully counterclockwise.		
19	Depress the STOP switch on the hydraulic test stand. <b>CAUTION: Avoid spilling oil on the fin seats.</b>		
20	Connect the hydraulic oil supply hose to the OIL FILL fitting on the APS. service panel.		
21	Connect a drain hose to the overboard dump tube. Place the other end of the drain hose in a 2-1/2-gallon (minimum) container.		
22	Depress the START switch on the hydraulic test stand.		
23	Turn the BY-PASS VALVE knob on the hydraulic test stand fully clockwise.		
24	Turn the knob on the oil fill valve fully counterclockwise.		
25	Open the OIL BLEED valve (fig. 4-5) on the APS service panel, and observe the flow of oil from the drain hose. When the flow is free of air bubbles, close the OIL BLEED valve, and observe that the HYD. RES. LEVEL indicator moves into the BLD position.		
25.1	Turn the knob on the oil fill valve fully clockwise. <b>CAUTION: The oil drained from the APS must not be reused in the APS.</b>		
25.2	At the TPCU, set the AC POWER switch to ON. <b>The POWER ON indicator light illuminates.</b>		
26	At the TCU, set the POWER switch to ON. <b>The POWER LIGHT indicator light illuminates.</b> <b>CAUTION: If the cooling unit is not used in the procedure below, be sure that operation of the transponder control group is limited to cycles not to exceed those prescribed in tables 4-7, 4-8, and 4-9.</b>		
27	Set the POWER switch on the cooling unit to ON. <b>CAUTION: Check that the weights of the INERTIA SWITCHES in the transponder group are in the forward position.</b> <b>CAUTION: If GYRO UNCAGED indicator light illuminates, immediately operate the GYRO switch to CAGE.</b>		
28	Set the HEATERS EXTERNAL and the PLATE POWER EXTERNAL switches to ON. <b>The HEATERS EXTERNAL indicator light illuminates.</b> <b>After approximately 30 seconds, the PLATE POWER EXTERNAL indicator light illuminates.</b> <b>CAUTION: The external drive motor must not be operated continuously for more than 20 minutes. The APS oil must be allowed to cool for a minimum of 30 minutes between runs.</b>		
29	Set the external drive motor switch to ON. <b>The ACC. AIR PRESS. gage indicates 2,500 to 3,000 psi.</b>		
30	Set ROLL POSITION switch on the (TCU) to GROUND.		

*Table 4-3. Hydraulic Oil Fill and System of the Accessory Power Supply,  
Using Hydraulic Test Stand M14—Continued*

<i>Step</i>	<i>Operation</i>	<i>Normal indication</i>	<i>Corrective procedure</i>
	<b>WARNING:</b> Insure that all personnel remain clear of the area surrounding the missile elevons while applying hydraulic pressure.		
31	Set the TEST SELECTOR No. 1 switch to BUZZ. V., and depress the ROLL pushbutton.	<b>The NULL METER indicates within the white zone.</b>	Adjust the R-BUZZ variable resistor (D, fig. 4-25 or A, fig. 4-26) in the transponder control group until the NULL METER indicates 1.
32	Depress the YAW pushbutton.	<b>The NULL METER indicates within the white zone.</b>	Adjust the Y-BUZZ variable resistor (D, fig. 4-25 or A, fig. 4-26) in the transponder control group until the NULL METER indicates 1.
33	Depress the PITCH pushbutton.	<b>The NULL METER indicates within the white zone.</b>	Adjust the P-BUZZ variable resistor (A, fig. 4-25 or A, fig. 4-26) in the transponder control group until the NULL METER indicates 1.
34	Set the POSITION switch to NORMAL.		
35	Set the TEST SELECTOR NO. 1 switch to TRANS. NO. 2.		
	<i>Note.</i> From the rear of the missile, the trailing edges of the Y elevons deflect to the left when the YAW pushbutton is depressed and the TEST SELECTOR NO. 2 switch is set to +G, and to the right when the YAW pushbutton is depressed and the TEST SELECTOR NO. 2 is set to -G. The trailing edges of the P elevons will deflect to the right when the PITCH pushbutton is depressed and the TEST SELECTOR NO. 2 switch is set to +G, and to the left when the PITCH pushbutton is depressed and the TEST SELECTOR NO. 2 switch is set to -G.		
36	Depress the YAW pushbutton, and alternately rotate the TEST SELECTOR NO. 2 switch between +G and -G for approximately 1 minute.	<b>The elevons deflect accordingly.</b>	
37	Depress the PITCH pushbutton, and alternately rotate TEST SELECTOR NO. 2 switch between +G and -G for approximately 1 minute.	<b>The elevons deflect accordingly.</b>	
38	Set the TEST SELECTOR NO. 2 switch to TRANS. NO. 1, the TEST SELECTOR NO. 1 switch to GYRO PRESET, and PRESET-FLIGHT switch to FLIGHT.		
39	Depress the ROLL pushbutton.		
40	Operate the GYRO PRESET switch to CW or CCW for approximately one minute.	<b>The elevons and NULL METER deflect accordingly.</b>	
41	Set the PLATE POWER EXTERNAL switch to OFF.	<b>The PLATE POWER EXTERNAL indicator light extinguishes.</b>	

*Table 4-3. Hydraulic Oil Fill and System of the Accessory Power Supply,  
Using Hydraulic Test Stand M14—Continued*

<i>Step</i>	<i>Operation</i>	<i>Normal indication</i>	<i>Corrective procedure</i>
42	Observe the ACC. AIR PRESS. gage indication. When the indication is between 2,500 and 3,000 psi, indicating that the accumulator has reached operating pressure, set the external drive motor switch to OFF.		
43	Open the OIL BLEED valve.		
	<b>The HYD. RES. LEVEL indicator moves to the -45° position.</b>		
44	Depress and hold the TRANSFER valve until oil flow stops.		
45	Turn the knob on the oil fill valve fully counterclockwise.		
46	When the oil stream flows free of air bubbles, close the OIL BLEED valve.		
	<b>The HYD. RES. LEVEL indicator moves to BLD.</b>		
47	Turn the knob on the oil fill valve fully clockwise.		
48	Set the external drive motor switch to ON.		
	<i>Note.</i> Do not allow the indication of the ACC. AIR PRESS. gage to drop below 2,500 psi while performing step 49.		
49	Depress and release the TRANSFER valve several times.		
50	Observe the ACC. AIR PRESS. gage indication. When the indication is between 2,500 and 3,000 psi, indicating that the accumulator has reached operating pressure, set the external drive motor switch to OFF.		
51	Open the OIL BLEED valve.		
	<b>The HYD. RES. LEVEL indicator moves to -45°.</b>		
52	Depress and hold the TRANSFER valve until the flow of oil from the drain hose stops.		
	<b>The ACC. AIR PRESS. gage indicates the approximate ambient temperature.</b>		
53	Turn the knob on the oil fill valve fully counterclockwise.		
54	When the oil stream flows free of air bubbles, close OIL BLEED valve.		
	<b>The HYD. RES LEVEL indicator moves to BLD.</b>		
55	Depress the TRANSFER valve, and hold it until all motion on ACC. AIR PRESS. gage ceases.		
56	Turn the knob on the oil fill valve fully clockwise.		
57	Turn the BY-PASS VALVE knob on the hydraulic test stand fully counterclockwise.		
58	Depress the STOP switch on the hydraulic test stand.		
59	Disconnect the hydraulic oil supply hose from the OIL FILL fitting.		
60	Operate the AUXILIARY POWER SUPPLY switch on the TPCU to STOP, and hold for a minimum of 1 second and a maximum of 2 seconds.		
61	Set the HEATERS EXTERNAL switch to OFF.		
	<b>The HEATERS EXTERNAL indicator light extinguishes.</b>		
62	Set the POWER switch on the cooling unit to OFF.		
63	Set the AC POWER switch on the TPCU and the POWER switch on the TCU to OFF.		
	<b>The POWER ON and POWER LIGHT indicator lights extinguish.</b>		
64	Set the external drive motor switch to ON. When ACC. AIR PRESS. gage reaches maximum pressure between 2,500 and 3,000 psi, immediately set the external drive motor switch to OFF.		

*Table 4-3. Hydraulic Oil Fill and System of the Accessory Power Supply,  
Using Hydraulic Test Stand M14—Continued*

<i>Step</i>	<i>Operation</i>	<i>Normal indication</i>	<i>Corrective procedure</i>
64 Cont			<p>If the ACC. AIR PRESS. gage indication exceeds 3,000 psi, perform the steps below.</p> <ol style="list-style-type: none"> <li>(1) Set the AC POWER switch on the TPCU to ON.</li> <li>(2) Set the POWER switch on the cooling unit to ON.</li> </ol> <p><b>CAUTION:</b> If the GYRO UNCAGE indicator light illuminates, immediately operate the GYRO switch to CAGE.</p> <ol style="list-style-type: none"> <li>(3) Set the HEATERS EXTERNAL and the PLATE POWER EXTERNAL switches to ON.</li> <li>(4) Operate the AUXILIARY POWER SUPPLY switch to START and hold for a minimum of 1 second and a maximum of 2 seconds.</li> <li>(5) Depress and hold the TRANSFER valve until oil flow stops. Allow the ACC. AIR PRESS. gage indication to decrease to the ambient temperature.</li> <li>(6) Operate the AUXILIARY POWER SUPPLY switch to STOP and hold for a minimum of 1 second and a maximum of 2 seconds.</li> <li>(7) Set the PLATE POWER EXTERNAL switch to OFF.</li> <li>(8) Set the HEATERS EXTERNAL switch to OFF.</li> <li>(9) Set the POWER switch on the cooling unit to OFF.</li> </ol>

*Table 4-3. Hydraulic Oil Fill and System of the Accessory Power Supply,  
Using Hydraulic Test Stand M14—Continued*

<i>Step</i>	<i>Operation</i>	<i>Normal indication</i>	<i>Corrective procedure</i>
64 Cont			(10) Set the AC POWER switch to OFF. (11) Repeat step 64.
65	Slowly open the OIL BLEED valve and observe that the oil stream is free of bubbles. When HYD. RES. LEVEL indicator moves to a position midway between 100° and 165°, close the OIL BLEED valve.		
65.1	<i>Note.</i> If air bubbles are observed at this point, repeat the entire oil servicing procedure.		
	Remove the external drive motor from the APS, and install the turbine cap. Torque the cap to 60 pound-inches, if the missile electrical checkout is not to follow.		
66	Disconnect the drain hose from the overboard dump tube.		

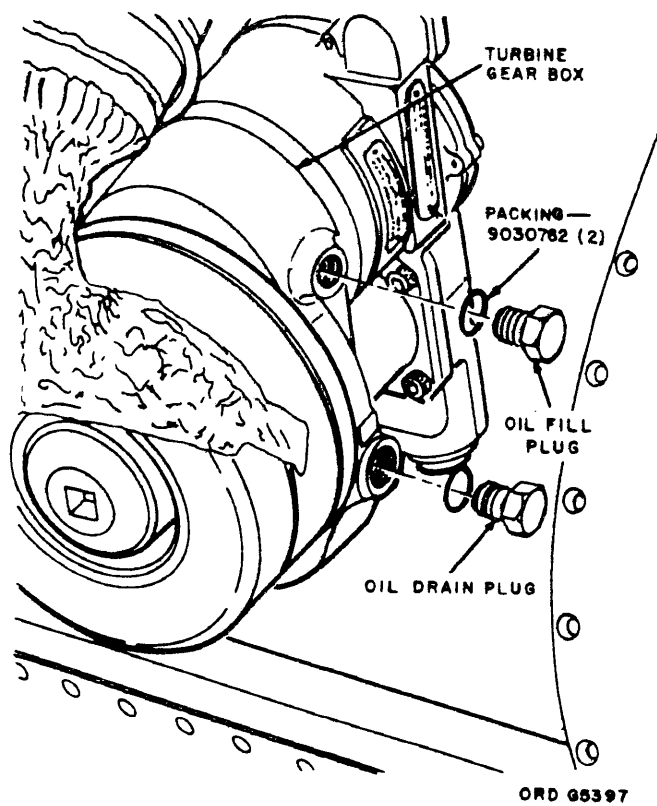


Figure 4-4. Inspection of the APS Turbine.

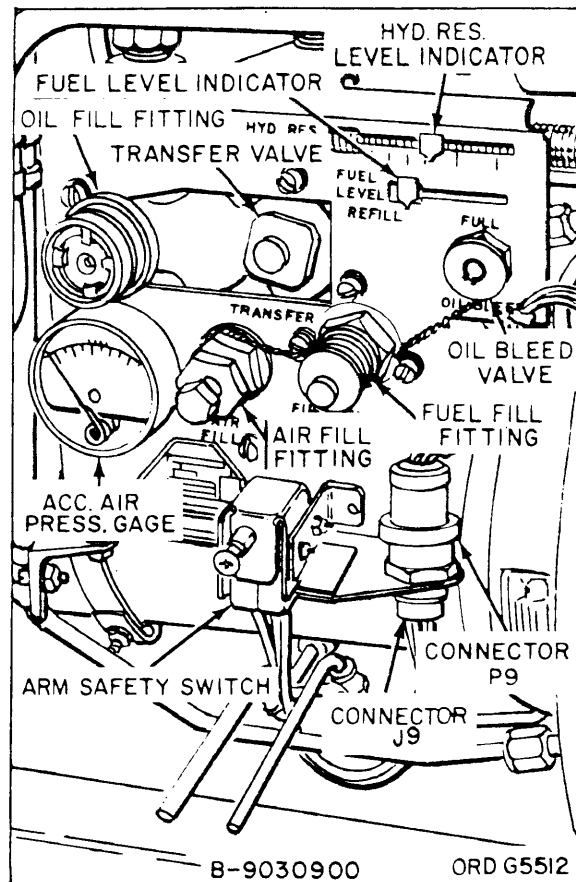
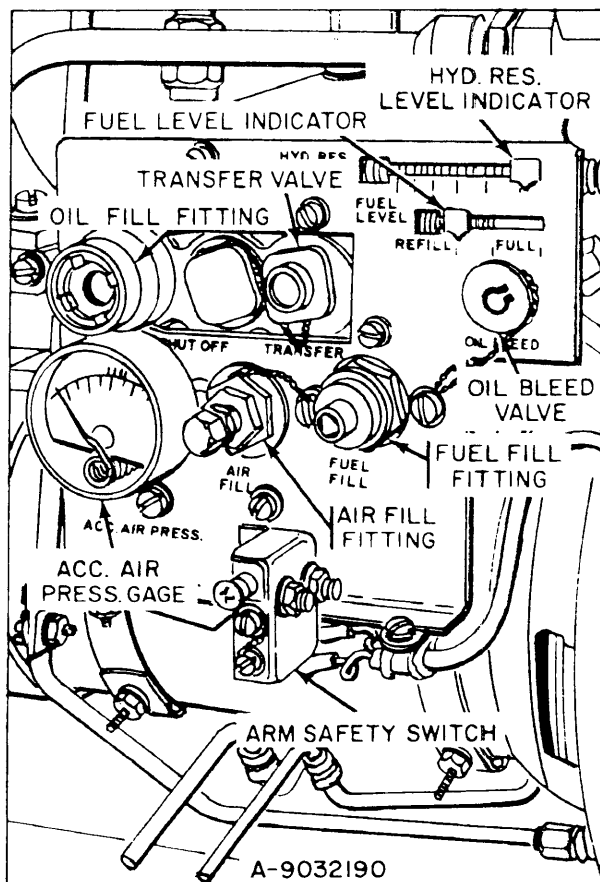


Figure 4-5. APS Service Panel.



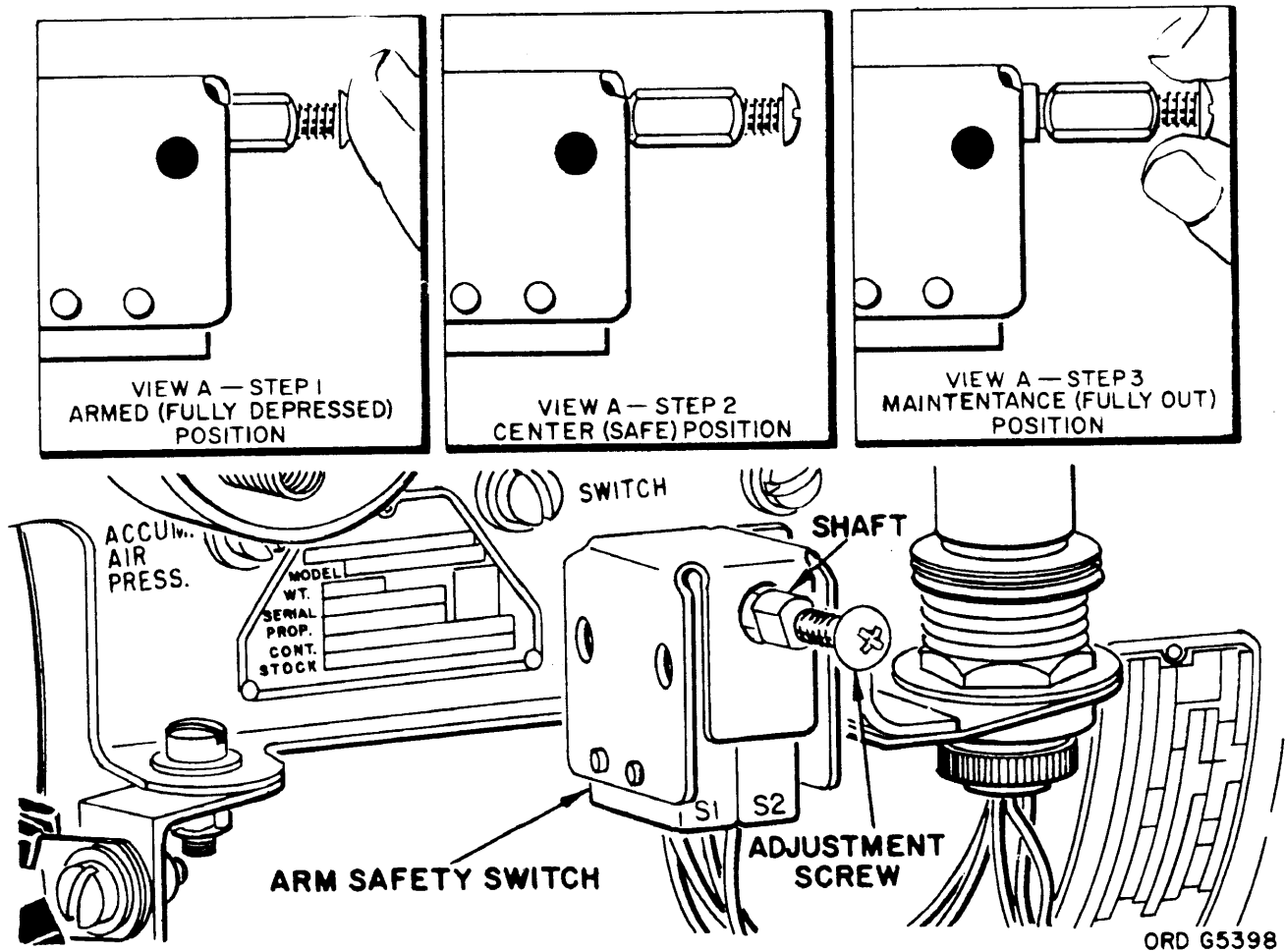


Figure 4-6. Arm Safety Check of the APS Arm SAFETY SWITCH.

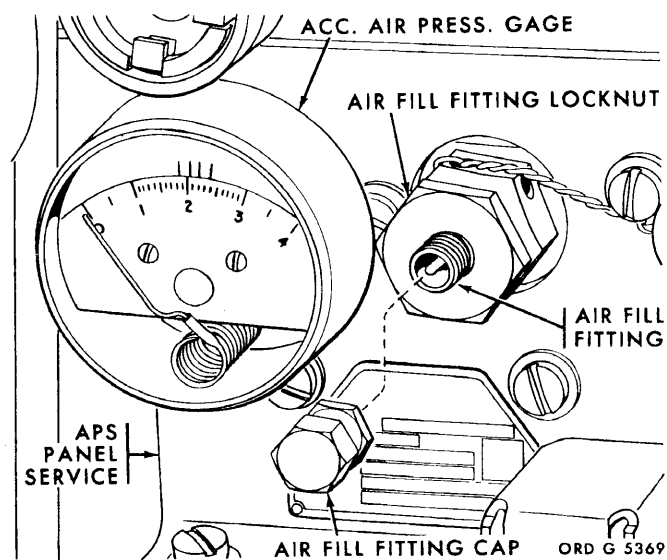
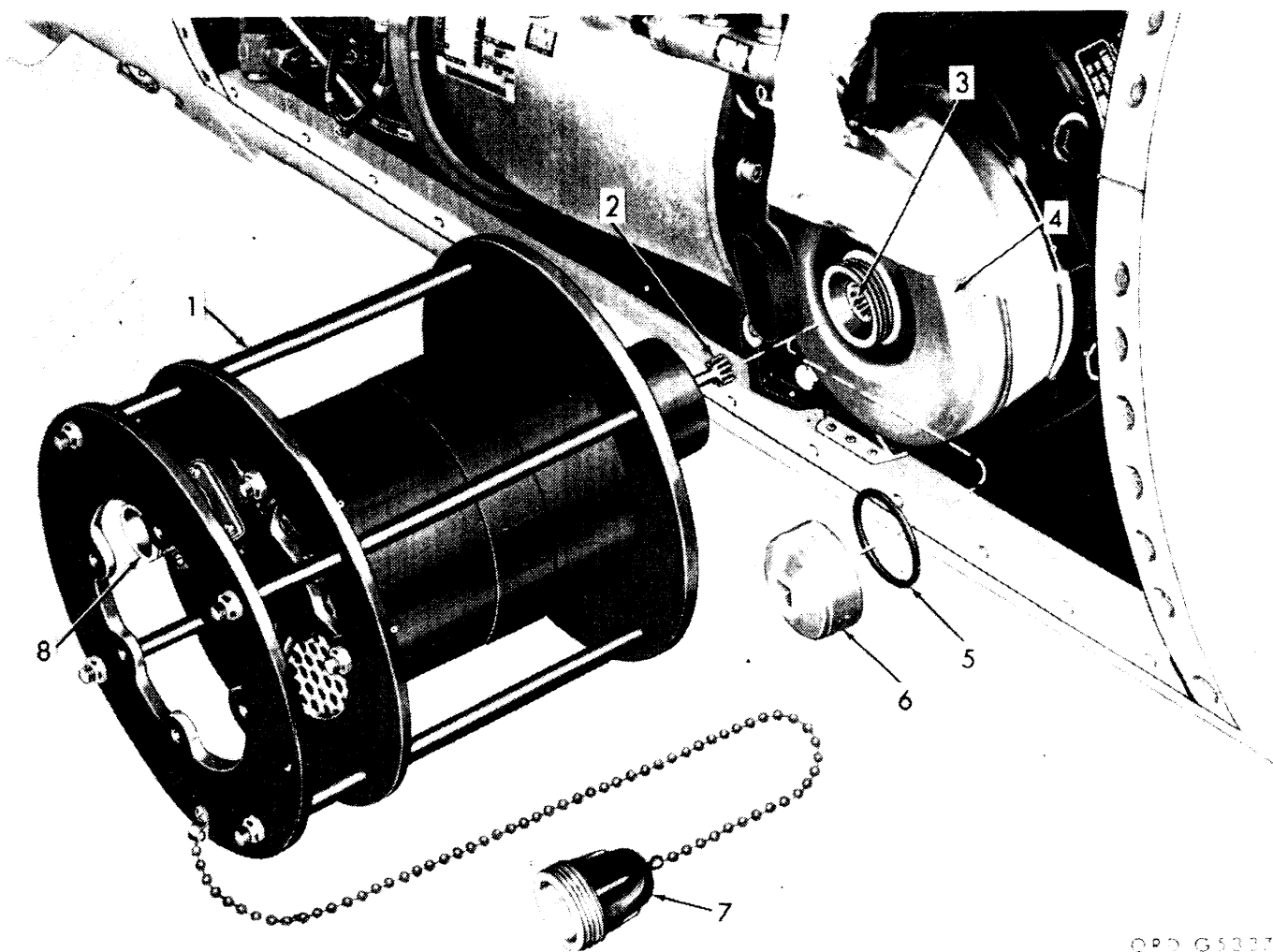


Figure 4-7. APS—accumulator air pressure gage and air fill fitting.



QPD G 5337

1—External drive motor  
2—External drive motor spline  
3—Turbine shaft

4—Turbine housing  
5—Gasket  
6—Turbine shaft cap

7—External drive motor spline cap  
8—Power connector

*Figure 4-8. Removal and installation of the external drive motor.*

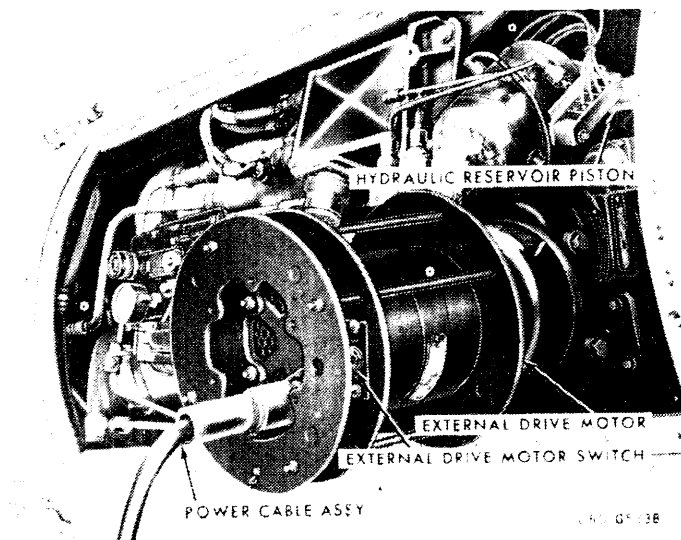
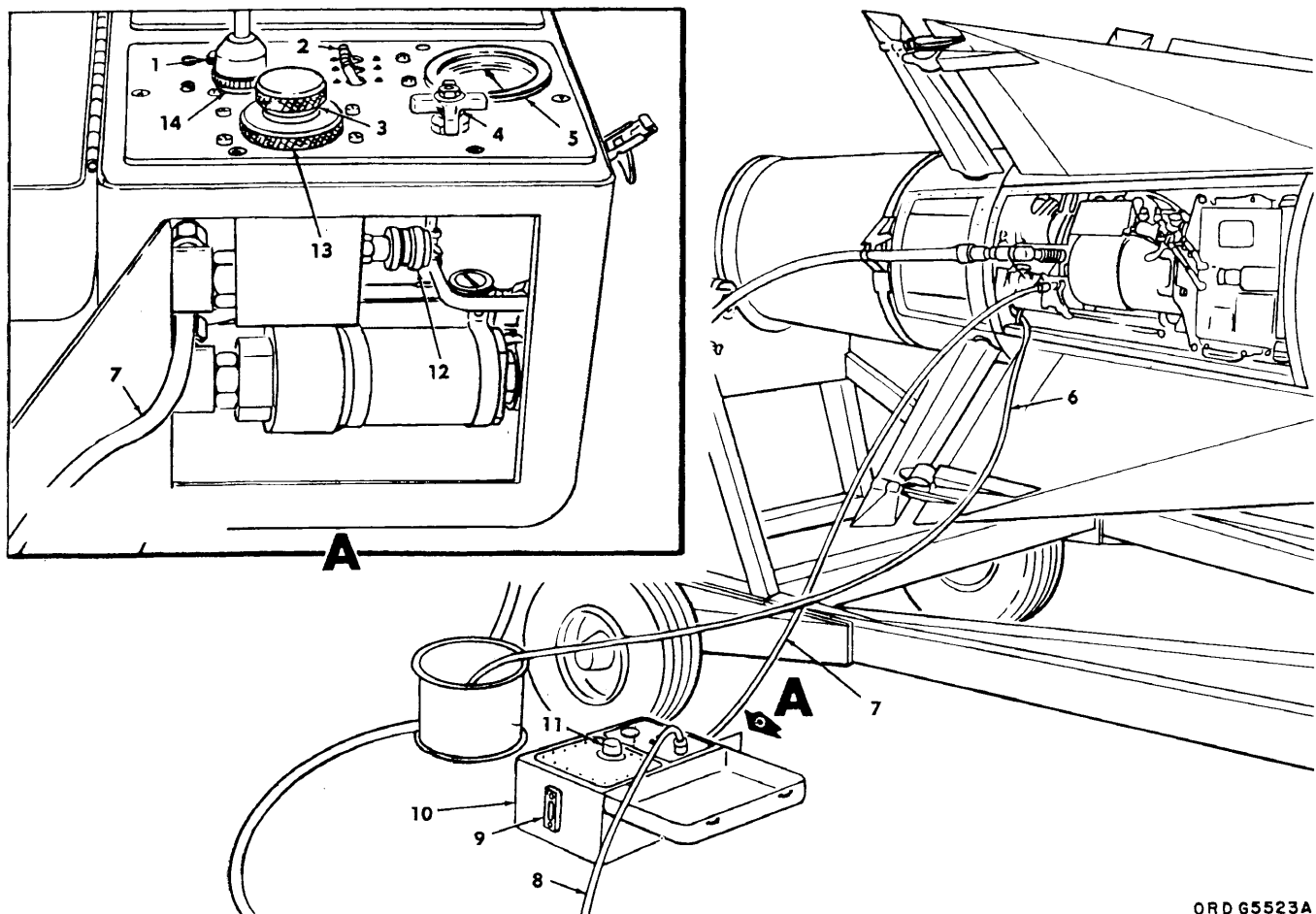


Figure 4-9. Removal and installation of the external drive motor power cable.



ORD G5523A

Figure 4-10. Oil fill and bleed of the HPU and APS, using the portable oil fill and filter unit.

1—LINE POWER indicator light  
2—OPERATE circuit breaker  
3—RELIEF VALVE knob  
4—BYPASS valve  
5—OIL PRESSURE gage  
6—Drain hose  
7—Hydraulic oil supply hose

8—Portable oil fill and filter unit power cable  
assembly  
9—Oil level gage  
10—Portable oil fill and filter unit  
11—Reservoir filler cap  
12—Manifold return port  
13—Locknut  
14—POWER connector J1

*Figure 4-10—Continued.*

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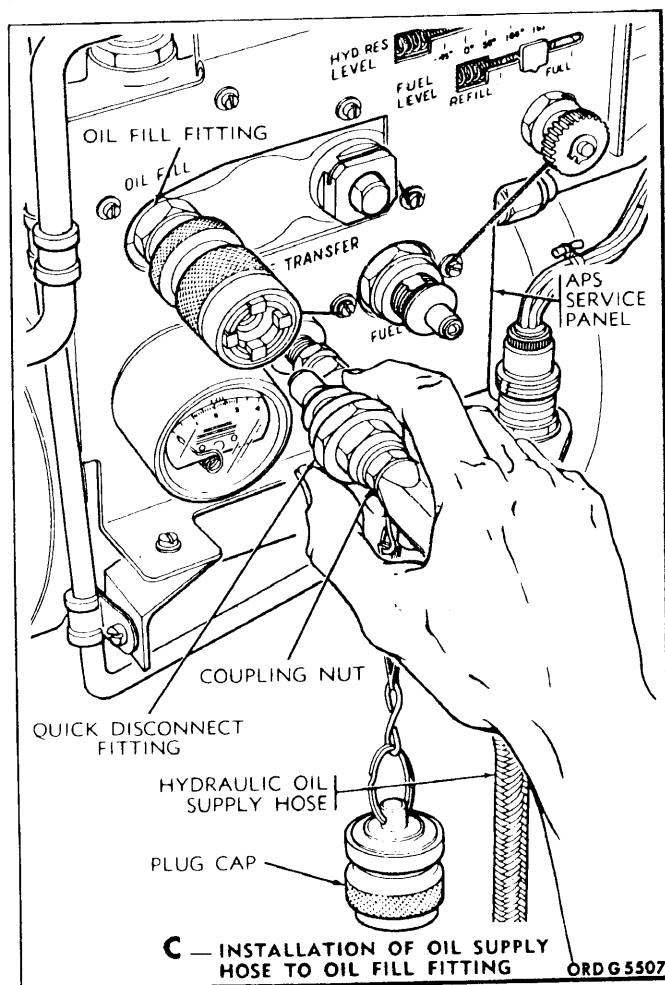
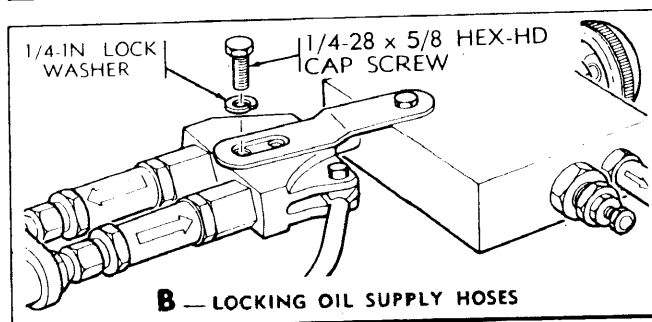
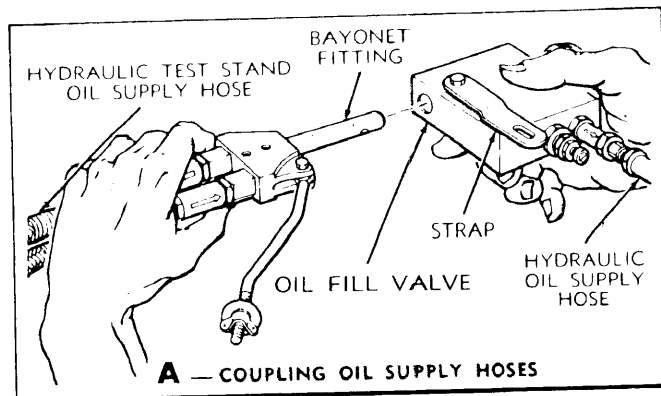
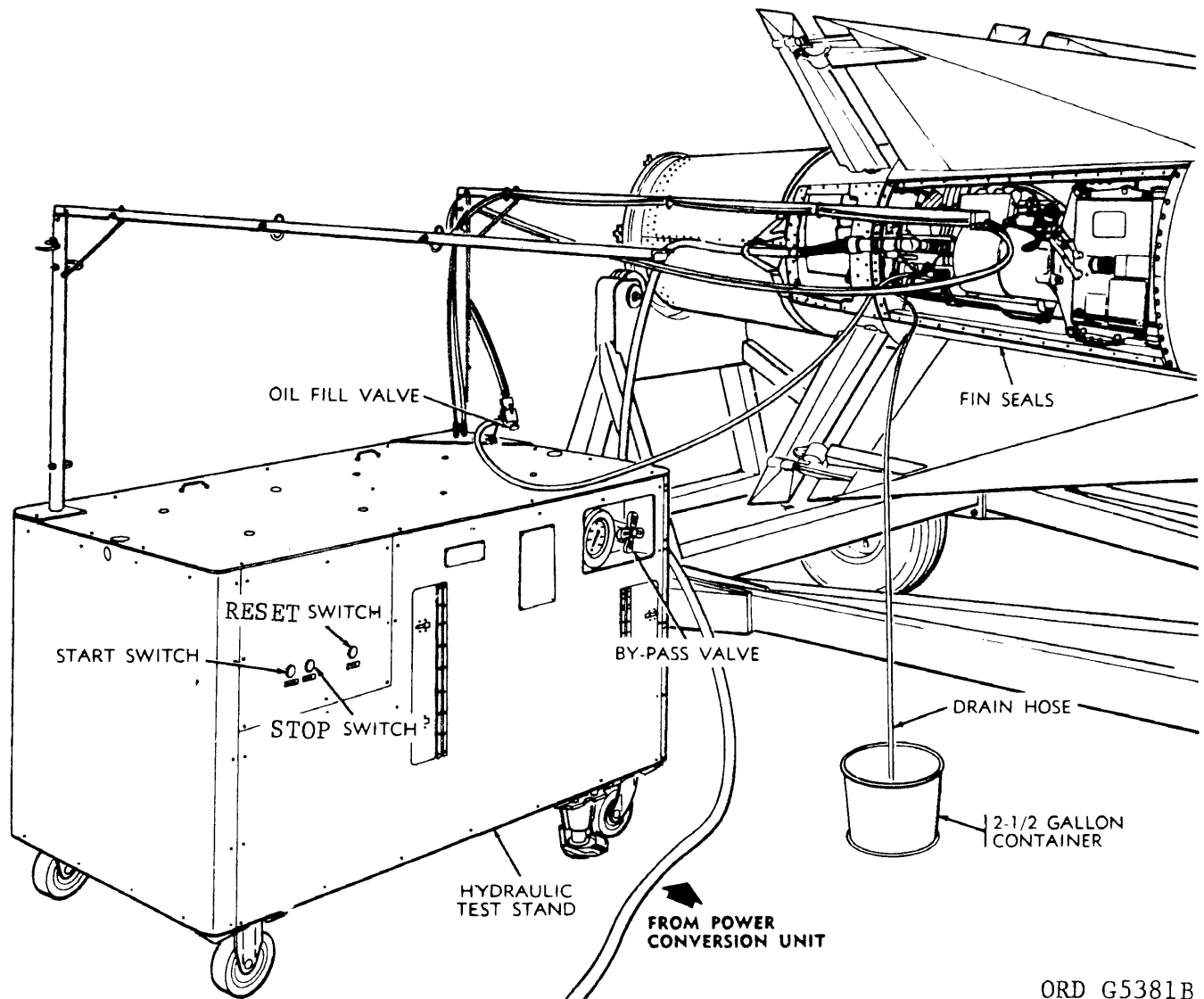


Figure 4-11. Oil fill valve installation.



ORD G5381B

Figure 4-12. Oil fill and bleed, using the hydraulic test stand—typical.

## Section II. AIR AND OIL SERVICING THE HYDRAULIC PUMPING UNIT (HPU)

### 4-8. General

The missile is shipped to the user with the HPU hydraulic system full and the accumulator depressurized.

### 4-9. Hydraulic Oil Low-Temperature Limitations

*a. General.* Reliable operation of the HPU at varying ambient temperatures requires that the viscosity of the hydraulic oil and the buzz

voltage settings be maintained within the specific limits set in table 4-12. This paragraph describes the low-temperature limitations of the different types of hydraulic oil used in the HPU.

*b. Limitations.* MIL-H-5606 hydraulic oil is used if the missile is continuously exposed to temperatures between 160°F and 30°F or if the low-temperature exposure of the missile is limited in accordance with table 4-12. Hydraulic oil MIS 10137 will be used if the

missile is continuously exposed to temperatures between 95°F and -10°F. MPD-2067 hydraulic oil will be used if the missile is continuously exposed to temperatures below 30°F.

#### 4-10. Servicing and Test Equipment

The servicing and test equipment necessary to service and check the operation of the HPU is listed below:

- a. The missile electrical test set group.
- b. The power conversion unit (fig. 4-14) (permanent-type installation) or the distribution box in the test station truck (fig. 4-15) (mobile-type installation).
- c. A source of clean, dry, compressed air (3,500 psi maximum, with a dewpoint of -40°F) or a nitrogen bottle with regulator, used to provide the initial air fill of the HPU.
- d. The oil fill valve used to adapt hydraulic test stand M14 (permanent-type installation) or the portable oil fill and filter unit (permanent-type or mobile-type installation).
- e. A 2-1/2-gallon (minimum) container and a hose for discharge of oil from the dump tube fitting on the HPU.
- f. Hydraulic oil, unopened cans, minimum 3 gallons.
- g. Hygrometer.
- h. Flexible Hydraulic Hose.

#### 4-11. Preliminary Procedure for HPU Servicing

*Note.* The preliminary procedures in this paragraph include those necessary for missile electrical checkout (p through af below).

- a. Connect a ground strap with a maximum resistance of 20 ohms to the missile frame at a point where proper electrical contact can be made and to a good earth ground.
- b. Visually inspect the HPU and all associated hydraulic lines and electrical connections. Make certain the HPU is securely mounted and properly torqued.

*Note.* Illustrated tables of controls and indicators for the missile electrical test set group are contained in TM 9-4935-253-12.

c. Check that AC POWER, HEATERS EXTERNAL, PLATE POWER EXTERNAL, and GLOW COIL switches on the test power control unit (TPCU) are set to OFF.

d. Set TEST SELECTOR NO. 1 switch on the test control unit (TCU) to OFF and TEST SELECTOR NO. 2 switch to TRANS. NO. 1.

*Note.* Perform e below for a permanent-type installation or f and g below for a mobile-type installation.

e. Connect the ground power cable assembly (fig. 4-13) to connector P104A and P105A on the missile umbilical cable assembly and to connector J7 on the rear of the missile electrical test set group.

f. Connect the ground power cable assembly to connectors P104A and P105A on the missile umbilical cable assembly and to the ground power extension cable assembly.

g. Connect the opposite end of the ground power extension cable assembly to connector J7 on the rear of the missile electrical test set group.

h. Connect the missile test cable assembly to connector J2 on the transponder control group and to connector J1 on the rear of the missile electrical test set group. Secure the cable assembly to the forward body section hoist.

*Note.* Perform i below for a permanent-type installation or j below for a mobile-type installation.

i. Connect a power cable assembly to connector J8 on the rear of the missile electrical test set group and to a 120-volt, 400- $\sim$  single-phase power source.

j. Connect a power cable assembly to connector J8 on the rear of the missile electrical test set group and to connector J13 on the distribution box in the test station truck.

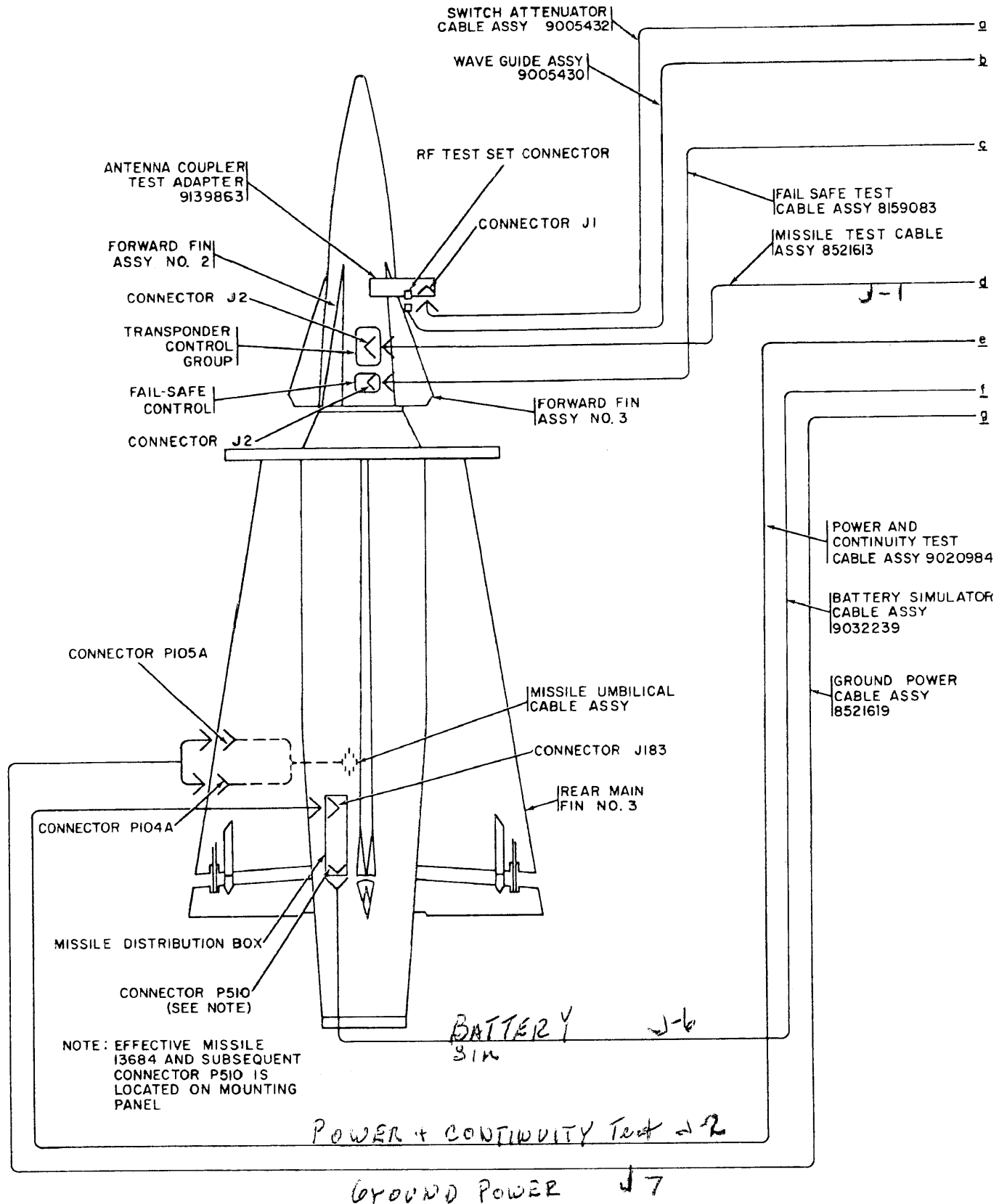
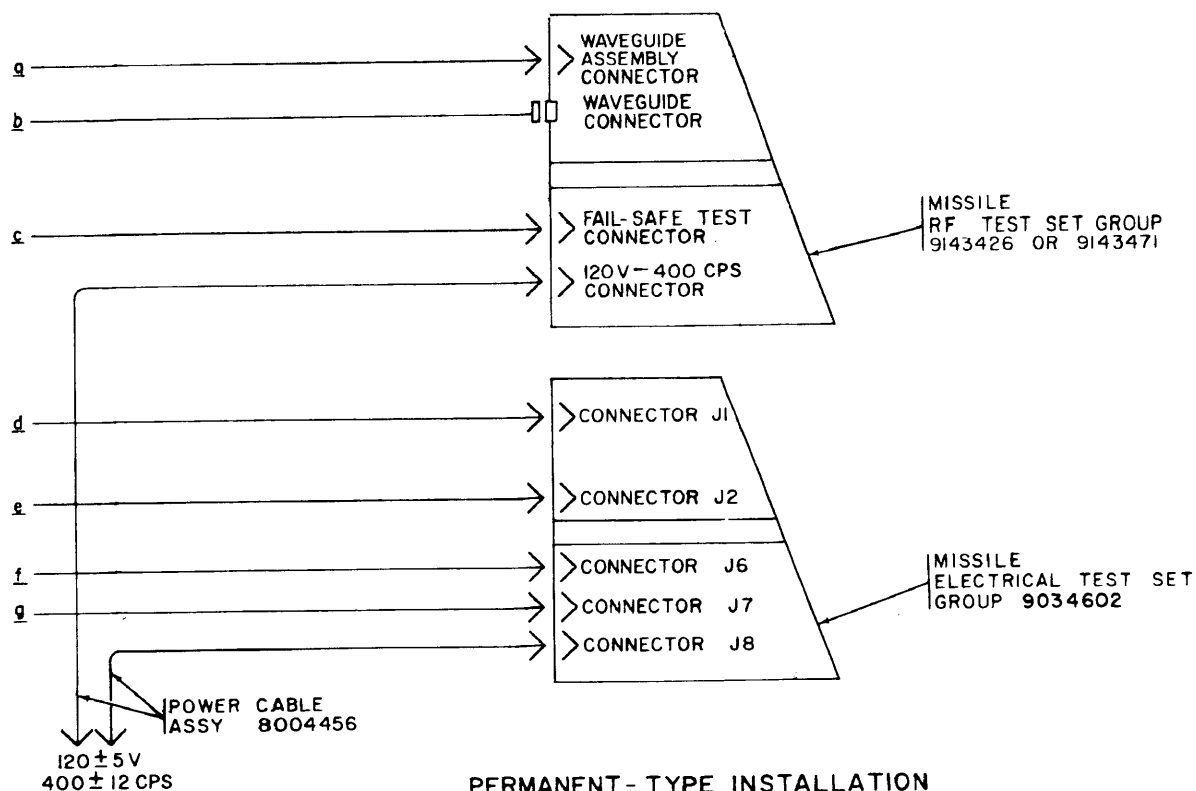
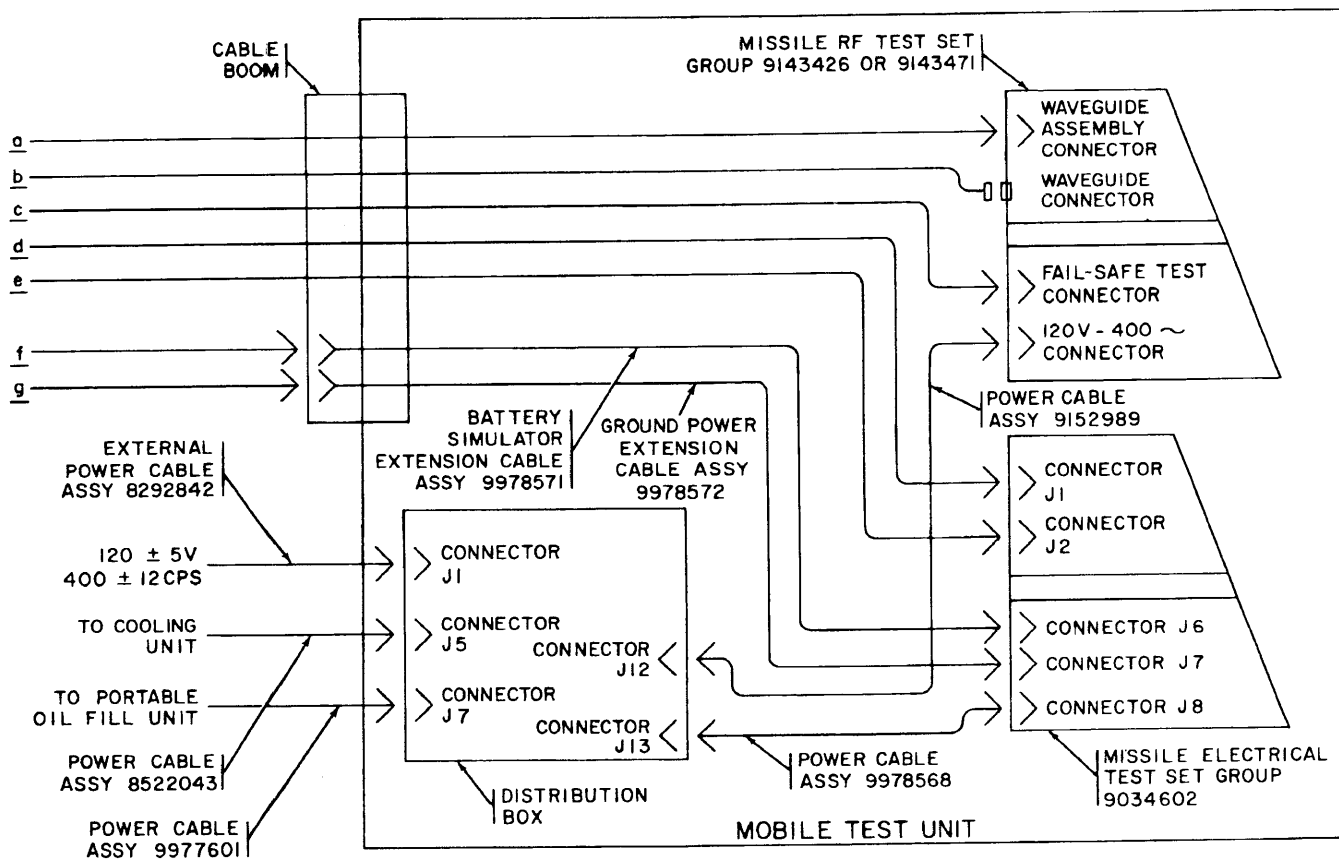


Figure 4-13. Cable connections for air and oil servicing and missile electrical checkout.  
(Sheet 1 of 2).





PERMANENT - TYPE INSTALLATION



MOBILE - TYPE INSTALLATION

ORD G5466

Figure 4-13. (Sheet 2 of 2).

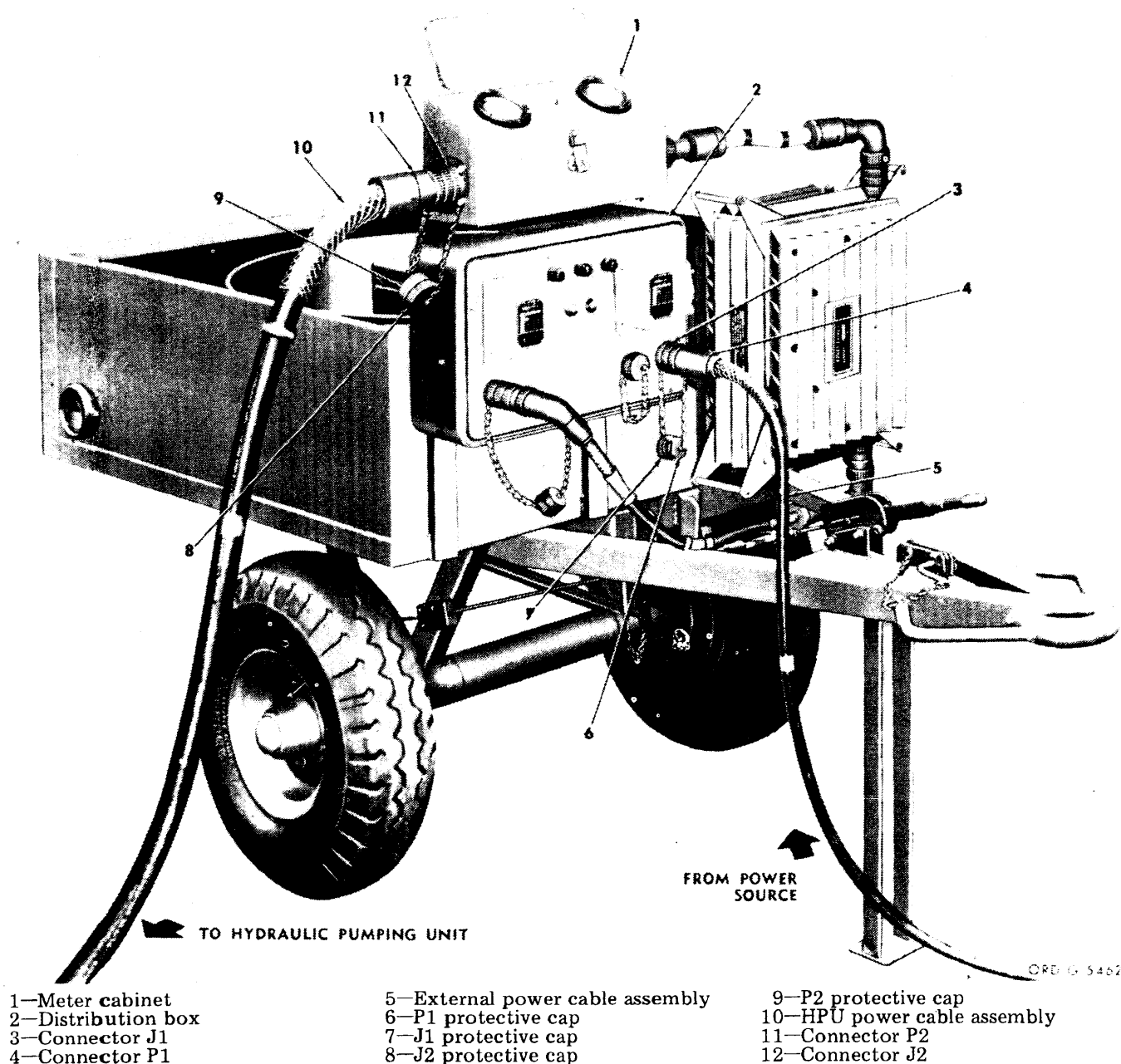


Figure 4-14. Cable disconnection and connection for the power conversion unit.

k. Install the air hose assembly (1, fig. 4-3) on the cooling unit (8).

l. Connect connector P1 (12) of the power cable assembly (9) to connector J1 (11).

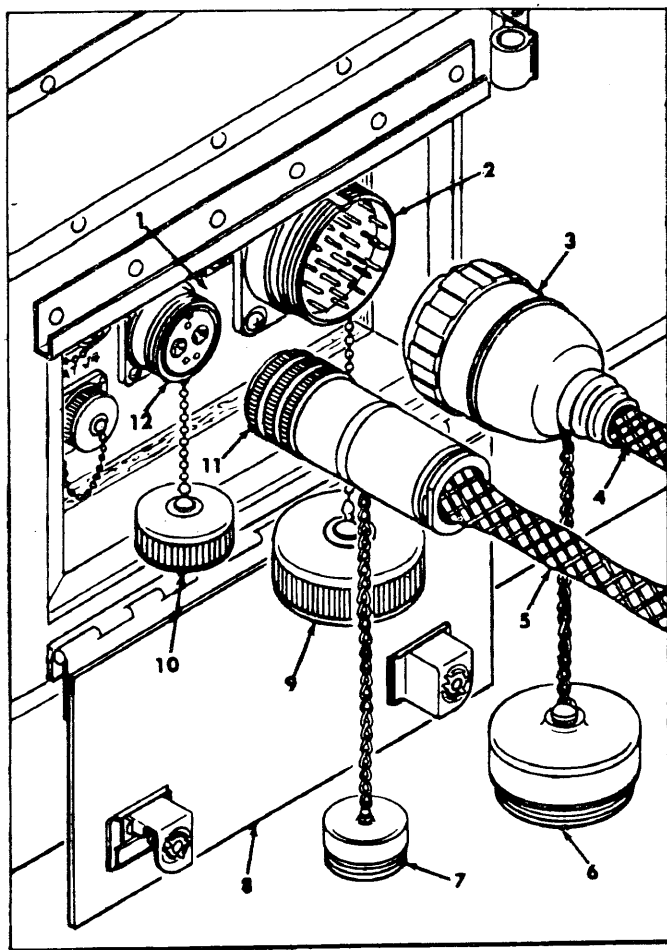
Note. Perform *m* below for a mobile-type installation and *n* below for a permanent-type installation.

m. Connect the opposite end of the power cable assembly to connector J5 on the distribution box (fig. 4-13) in the mobile test unit.

n. Connect the opposite end of the power cable assembly to a 208-volt, 400  $\sim$ , 3-phase power source.

o. Connect the air hose assembly (1, fig. 4-3) to the hose coupling adapter (2) or the hose assembly (5).

**CAUTION:** Check that AC POWER switch on the TPCU is set to OFF before connecting the cables.



ORD G 5461

- 1—Distribution box
- 2—Connector J1
- 3—Connector P1
- 4—External power cable assembly
- 5—HPU power cable assembly
- 6—P1 protective cap
- 7—P8 protective cap
- 8—Access door
- 9—J1 protective cap
- 10—J8 protective cap
- 11—Connector P8
- 12—Connector J8

Figure 4-15. Cable disconnection and connection for the test station truck.

**CAUTION:** The ground strap connection in *a* above must remain connected during missile electrical checkout.

*Note.* Perform *p* below for a permanent-type installation or *q* and *r* below for a mobile-type installation.

*p.* Connect a power cable assembly (fig. 4-13) to 120V, 400- $\sim$  connector on the rear of the missile RF test set group and to a 120-volt, 400- $\sim$  power source.

*q.* Connect a power cable assembly (fig. 4-13) to 120V-400  $\sim$  connector on the rear

of the missile RF test set group and to connector J12 on the distribution box in the mobile test unit.

*r.* Connect the external power cable assembly to connector J1 on the distribution box in the mobile test unit and to a 120-volt, 400- $\sim$  power source.

*s.* Set TEST SELECTOR switch on the RF test set to CAL, CALIBRATE switch to ADJ, and FAIL-SAFE TEST—CONTACT-NORMAL-TIME switch to NORMAL.

*t.* Set AC POWER switch on the RF test set to ON.

*u.* After 60 seconds, momentarily operate RESPONSE -250V switch on the RF test set to -250V. If RESPONSE OR VOLTAGE meter does not deflect to the right, immediately set AC POWER switch to OFF.

*v.* Set CALIBRATE switch to TEST, and allow at least a 30 minute warmup. Proceed with equipment and cable connections while the RF test set is warming up.

*w.* Connect test equipment as prescribed below.

(1) Remove the three stud assemblies (fig. 4-22) from the forward body section. Install the antenna coupler test adapter over forward fin assembly 3. Secure the adapter over the fin assembly by aligning the three captive fasteners of the mounting brackets with the mating parts in the missile skin of the forward body section, and rotate the fasteners to the locked position by hand.

(2) Install waveguide coupling (RF terminator) 9000245 (fig. 4-23) on transmitting antenna horn no. 1.

(3) Connect waveguide assembly 9138481 to receiving antenna horn 4.

(4) Connect waveguide assembly 9138342 to waveguide assembly 9128481 and to one RECEIVER ANTENNA connector on the antenna coupler test adapter.

- (5) Connect waveguide assembly 9138483 to receiving antenna horn 2.
- (6) Connect waveguide assembly 9138341 to waveguide assembly 9138383 and to the other RECEIVER ANTENNA connector on the antenna coupler test adapter.
- (7) Connect waveguide assembly 9138482 to transmitting antenna horn 3.
- (8) Connect waveguide assembly 9138340 to waveguide assembly 9138482 and to TRANSMITTING ANTENNA connector on the antenna coupler test adapter.
- (9) Connect waveguide assembly 9005430 to RF TEST SET connector on the antenna coupler test adapter and to the waveguide connector (fig. 4-13) on the rear of the missile RF test set group.
- (10) Connect the switch attenuator cable assembly to connector J1 on the antenna coupler test adapter and to WAVEGUIDE ASSEMBLY connector on the rear of the missile RF test set group.
- (11) Connect the fail-safe test cable assembly (fig. 4-13) to connector J2 on the fail-safe control and to FAIL-SAFE TEST connector on the rear of the missile RF test set group.
- (12) Check that the transponder control group wiring harness connector P1 (19, fig. 3-31) is connected to transponder control group connector J1 (16, fig. 3-31) in forward body section.

*Note.* Perform step (13) below for missiles 10206 through 11935 and 13001 through 13683.

- (13) Disconnect connector J510 on the battery wiring harness from connector P510 on the distribution box, and connect the battery simulator cable assembly (fig. 4-13) from connector P510 on the missile distribution box to connector J6 on the rear of the missile electrical test set group.

*Note.* Perform step (14) or (15) and (16) below for missiles 13684 and subsequent.

*Note.* Perform step (14) below for a permanent-type installation or steps (15) and (16) below for a mobile-type installation.

- (14) Connect the battery simulator cable assembly to connector P510 on the mounting panel and to connector J6 on the rear of the missile electrical test set group.
- (15) Connect the battery simulator cable assembly to connector P510 on the mounting panel and to the battery simulator extension cable assembly test unit.
- (16) Connect the opposite end of the battery simulator extension cable assembly to connector J6 on the rear of the missile electrical test set group.
- (17) Connect the power and continuity test cable assembly to connector J2 on the rear of the missile electrical test set group and to connector J183 on the missile distribution box.
- (18) Remove the closures (6, fig. 3-31) from the four ram-pressure probes (2, fig. 4-24). Install the adapter hose assembly (1) on one of the ram-pressure probes, and install the plug hose assemblies (4) on the three remaining probes. Secure the adapter hose and plug hose with the hose clamps (3).

*Note.* Perform steps *w.1.* through *ab* below for missiles 13001 and subsequent.

*w.1.* Rotate the mated forward and rear body section so that the forward body section is in the flight position.

*x.* Remove the hexagon-head bolt (11, fig. 3-29) and flat washer (10) that secure the left side of the forward body section (8) to the testing fixture (5).

**Caution:** Check the placement of the wiring harnesses before opening or closing the forward body section hinged to the testing fixture to make certain they will not be damaged.

**Warning:** Insure that the self-locking pins (view A, fig. 9-1) are inserted through the handling ring segment prior to performing *y* below.

*y.* Swing the forward body section to the right until the hinge lock pin (12, fig. 3-29) snaps into the locked position.

z. Loosen the six captive screws that secure the access cover plate to the transponder control group sufficiently to insure depletion of air-pressure.

**Warning:** Potentials of 4,000 volts exist on the magnetron connector shell and under the radio transmitter cover. Be careful not to contact high-voltage components.

**Caution:** Do not remove the rear housing cover (10, fig. 12-2) unless the forward body section is swung fully open and the hinge lock pin (12, fig. 3-29) is locked in position.

aa. Remove the rear housing cover from the transponder control group (1, fig. 12-2) as prescribed in steps (1) and (2) below.

- (1) Loosen the retaining screw (11), and disengage the lever arm (12).
- (2) Exert a steady pull on the two hook handles (23), and remove the rear housing cover from the transponder control group.

ab. Install the missile-code delay line (5, fig. 12-3) in the transponder control group (1).

ac. Insure that the missile-code delay line is fully seated.

ad. Insure that the locking tab on the missile-code delay line will not move clockwise sufficiently to clear the locking slot.

ad.1. Using a screwdriver, insure that all captive screws securing plug-in components or modules are properly tightened.

ad.2. Insure a positive mechanical mating of connectors P1 and J1, P8 and J8, and P2 and J2 (4, 22, and 23, fig. 12-6).

ae. Install the rear housing cover on the transponder control group as described in steps (1) through (6) below.

**Caution:** Do not use any type of tool on the rear housing cover to assist seating. Support the forward body section while installing the rear housing cover.

(1) (Deleted)

(2) With the pressure valve (7, fig. 12-2) on the right, seat the rear housing cover on the transponder control group until the retaining ring (14) is approximately flush with the rim of the housing.

(3) Apply pressure to the right hook handle while maintaining a retaining pressure on the left hook handle. When the rear housing cover has seated on the right side, hold a retaining pressure on the right hook handle, and increase pressure on the left hook handle until the rear housing cover seats on the left side.

(4) Press firmly on all sides of the rear housing cover and on each side of the lever arm to insure proper seating.

**Caution:** Do not force the lever arm, which should close freely to approximately three-eighths of an inch. If force is required to engage the lever arm, the rear housing cover is not seated properly.

(5) Engage the lever arm (12), and tighten the retaining screw (11) to secure the rear housing cover (10) to the transponder control group.

(6) Inspect the entire retaining ring (14) for proper seating.

**Caution:** Check the placement of the wiring harnesses before opening or closing the forward body section hinged to the testing fixture, to make certain they will not be damaged.

**Caution:** Lift and support the forward body section while installing and tightening the hexagon-head bolt in af below.

af. Swing the forward body section to the left until the hinge lock pin (12, fig. 3-29) snaps into the locked position. Install the hexagon-head bolt (11) and the flat washer (10) that secure the left side of the forward body section (8) to the testing fixture (5).

af.1. Rotate the missile body to the normal flight position.

ag. Insure that the cooling unit is connected.

Table 4-4. Initial Air Fill of the Hydraulic Pumping Unit (HPU)

Step	Operation	Normal indication	Corrective Procedure
	<p><i>Note.</i> Use clean, dry, compressed air, with a dewpoint of <math>-40^{\circ}\text{F}</math> and a maximum pressure of 3500 psi, or use nitrogen.</p> <p><b>Warning:</b> Weight the air supply hose with sand bags, and secure it to the missile body truck. Assure that the air fill valve on the end of the air supply hose is fully closed.</p>		
1.	Remove the AIR FILL valve cap (5, fig. 4-18) from the AIR FILL valve (3) on the indicator panel.		
2.	Connect the air supply hose from the air supply to the AIR FILL valve.		
	<p><i>Note.</i> For expected outside temperatures of from <math>+30^{\circ}</math> to <math>+165^{\circ}\text{F}</math>, apply air pressure until the ACC. AIR PRESS. gage (2) indicates the ambient temperature <math>\pm 25^{\circ}\text{F}</math>. For an expected outside operating temperature of from <math>+30^{\circ}</math> to <math>-40^{\circ}\text{F}</math>, apply air pressure until the ACC. AIR PRESS. gage indicates as shown below with corresponding building temperature:</p>		
		Building temperature	AIR accumulator precharge pressure ( $\pm 25$ psi)
		$80^{\circ}\text{F}$ .....	2400
		$72^{\circ}\text{F}$ .....	2350
		$63^{\circ}\text{F}$ .....	2300
		$55^{\circ}\text{F}$ .....	2250
		$47^{\circ}\text{F}$ .....	2200
		$38^{\circ}\text{F}$ .....	2150
		$30^{\circ}\text{F}$ .....	2100
3.	Set the AC POWER switch on the TPCU to ON.		
	<b>The POWER ON indicator light illuminates.</b>		
3.1	Loosen the six captive screws that secure the access cover plate to the TCG sufficiently to insure depletion of the air pressure. Remove the cover plate and allow it to hang by the chain.		
	<b>Caution:</b> Check that the weights of the INERTIA SWITCHES in the TCG are in the forward (dearmed) position.		
4.	Set the POWER switch on the TCU to ON.		
	<b>The POWER LIGHT indicator illuminates.</b>		
5.	Set the POWER switch (10, fig. 4-3) on the cooling unit to ON.		
	<b>Caution:</b> If the GYRO UNCAGE indicator light illuminates, immediately operate the GYRO switch to CAGE.		
6.	Set the HEATERS EXTERNAL and the PLATE POWER EXTERNAL switches on the TPCU to ON.		
	<b>The HEATERS EXTERNAL indicator light illuminates. After approximately 30 seconds, the PLATE POWER EXTERNAL indicator light illuminates.</b>		
7.	Open the air supply shutoff valve.		
8.	Open the AIR FILL valve locknut (4, fig. 4-18) counterclockwise.		
9.	Slowly open the air fill valve on the air supply hose.		
10.	When the ACC. AIR PRESS. gage (2) indicates the correct pressure, as prescribed in the precharge list (step 2), close the air fill valve on the air supply hose.		
10.1	Turn the AIR FILL valve locknut (4) fully clockwise.		
11.	(Deleted)		

Table 4-4. Initial Air Fill of the Hydraulic Pumping Unit (HPU) — Continued

Step	Operation	Normal indication	Corrective Procedure
12.	Repeat steps 8 through 10.1 as necessary to obtain a stable indication as prescribed in the precharge list (step 2).		
13.	Close the air supply shutoff valve.		
14.	Open the AIR FILL valve (3) on the air supply hose.		
14.1	Bleed the pressure from the air supply hose.		
	<b>Warning:</b> Make certain all pressure is bled from the hose before performing step 15.		
15.	Disconnect the air supply hose and install the AIR FILL valve cap (5) on the AIR FILL valve. Torque the AIR FILL valve locknut (4) to 50 pound-inches.		
16.	Set the PLATE POWER EXTERNAL switch on the TPCU to OFF. The PLATE POWER EXTERNAL indicator light extinguishes.		
17.	Set the HEATERS EXTERNAL switch to OFF. The HEATERS EXTERNAL indicator light extinguishes.		
18.	Set the POWER switch on the cooling unit to OFF.		
19.	At the TCU, set the POWER switch to OFF. The POWER LIGHT extinguishes.		
20.	At the TPCU, set the AC POWER switch to OFF. The POWER ON light extinguishes.		

Table 4-5. Hydraulic Oil Fill and System Cleanup of the Hydraulic Pumping Unit, using the Portable Oil Fill and Filter Unit

Step	Operation	Normal indication	Corrective Procedure
	<b>Warning:</b> Voltage is present on the negative and positive leads of HPU cable assembly 9019903 when the power conversion unit is turned on. Insure that the leads are completely covered with rubber cable nipples.		
	<b>Caution:</b> The initial air fill of the HPU must be completed as prescribed in table 4-4 before performing the procedures prescribed below.		
	<b>Caution:</b> The oil drained from the HPU must not be reused.		
1.	Perform the procedures prescribed in paragraph 4-11, if applicable.  <i>Note.</i> The system cleanup is to be performed during assembly, annually, and whenever major repair or replacement of the hydraulic system is accomplished.  <i>Note.</i> Perform step 2 for a permanent-type installation or step 3 for a mobile-type installation.		
2.	Connect the cables on the power conversion unit as prescribed in steps <i>a</i> through <i>h</i> below. <i>a.</i> Remove the J1 protective cap (7, fig. 4-14) from connector J1 (3). <i>b.</i> Remove the P1 protective cap (6) from connector P1 (4). <i>c.</i> Connect the external power cable assembly (5) to connector J1 on the distribution box (2). <i>d.</i> Install the P1 protective cap on the J1 protective cap. <i>e.</i> Remove the J2 protective cap (8) from connector J2 (12). <i>f.</i> Remove the P2 protective cap (9) from connector P2 (11). <i>g.</i> Connect the HPU power cable assembly (10) to connector J2 on the meter cabinet (1). <i>h.</i> Install the P2 protective cap on the J2 protective cap.		
3.	Connect the cables on the mobile test unit as prescribed in steps <i>a</i> through <i>g</i> below. <i>a.</i> Open the access door (8, fig. 4-15) on the mobile test unit. <i>b.</i> Remove the J1 protective cap (9) from connector J1 (2).		

Table 4-5. Hydraulic Oil Fill and System Cleanup of the Hydraulic Pumping Unit, using the Portable Oil Fill and Filter Unit — Continued

Step	Operation	Normal indication	Corrective procedure
3 — Cont	c. Remove the P1 protective cap (6) from connector P1 (3). d. Connect the external power cable assembly (4) to connector J1 on the distribution box (1). e. Remove the J8 protective cap (10) from connector J8 (12). f. Remove the P8 protective cap (7) from connector P8 (11). g. Connect the HPU power cable assembly (5) to connector J8 on the distribution box.		
4.	Connect the HPU power cable assembly as prescribed in steps a through g below.  <b>Caution:</b> Check that the ELECTRICAL HPU POWER switch on the power conversion unit (permanent-type installation) is set to OFF, or that the ELECTRICAL HPU STOP pushbutton (mobile-type installation) has been depressed. a. Connect the external power cable assembly (5, fig. 4-14) to a 120/208-volt, 3-phase, 400-~ power source. b. Install the cable retainer assembly (1, fig. 4-16) on the actuator section in the position shown, and secure firmly with the buckle and strap (2). c. Remove the GROUND PLUG protective cap (6) from connector J546 (7). d. Remove the P546 protective cap (4) from connector P546 (3).  <b>Caution:</b> The HPU power cable assembly (9) must be properly supported to prevent damage to the GROUND PLUG connector J546 and the indicator panel (8). Insure that the cable head connector P546 is properly seated in the GROUND PLUG connector J546 and that the cable assembly is firmly secured in the cable retainer assembly when performing steps e and f below. e. Connect the HPU power cable assembly to the GROUND PLUG connector J546 on the indicator panel. f. Install the HPU power cable assembly in the cable retainer assembly. g. Install the P546 protective cap on the GROUND PLUG protective cap.  <i>Note.</i> Before connecting the portable oil fill and filter unit to the HPU, preliminary filtration procedures must be performed as prescribed in 5 through 14 below.		
5.	Remove the reservoir filler cap (11, fig. 4-10) on the portable oil fill and filter unit (10) and fill the reservoir with hydraulic oil until the oil level gage (9) indicates FULL. Replace the reservoir filler cap.		
6.	Connect the portable oil fill and filter unit power cable assembly (8) to the POWER connector J1 (14) on the portable oil fill and filter unit.  <b>Caution:</b> Make certain that the OPERATE circuit breaker (2) on the portable oil fill and filter unit is set to OFF before performing steps 7 through 12 below.  <i>Note.</i> Perform steps 7 and 8 below for a permanent-type installation or steps 9 and 10 for a mobile-type installation.		
7.	Connect the other end of the power cable assembly to the ETO APS RUNUP MOTOR connector J2 on the distribution box (2, fig. 4-14) at the power conversion unit.		
8.	Set the ETO APS RUNUP MOTOR circuit breaker to ON.  <b>The LINE POWER indicator light (1, fig. 4-10) on the portable oil fill and filter unit illuminates.</b>		
9.	Connect the other end of the power cable assembly to J7 (fig. 4-13) on the distribution box in the test station truck.		
10.	Set circuit breaker CB4 to ON.  <b>The LINE POWER indicator light on the portable oil fill and filter unit illuminates.</b>		



Table 4-5. Hydraulic Oil Fill and System Cleanup of the Hydraulic Pumping Unit, using the Portable Oil Fill and Filter Unit — Continued

Step	Operation	Normal indication	Corrective procedure
11.	Connect the hydraulic oil supply hose (7, fig. 4-10) to the quick-disconnect fitting on the manifold return port (12).		
12.	Turn the BYPASS valve (4) fully counterclockwise. Unlock and turn the RELIEF VALVE knob (3) fully counterclockwise.		
	<b>Caution:</b> When the OPERATE circuit breaker is set to ON, check for a pressure indication on the OIL PRESSURE gage. If there is no pressure indication, immediately set the OPERATE circuit breaker to OFF and verify correct power phasing, perform corrective maintenance procedures.		
13.	Set the OPERATE circuit breaker to ON.		
	<i>Note.</i> When performing step 14 below, check the OIL PRESSURE gage (5) indication. If the indication exceeds 100 psi, refer the portable oil fill and filter unit to the direct support unit for primary filter replacement.		
14.	Operate the portable oil fill and filter unit for 30 minutes, and then set the OPERATE circuit breaker to OFF.		
15.	Remove the right equipment section access cover plate (2, fig. 3-21), if not previously removed.		
16.	Connect the hydraulic oil supply hose to the OIL FILL valve (6, fig. 4-17) on the HPU indicator panel (1).		
17.	Remove the dump tube assembly (5, fig. 12-44) from the oil bleed port (4) on the HPU. Connect the drain hose (6, fig. 4-10) to the oil bleed port and place the other end of the hose into a 2½ gallon (minimum) container. Open the OIL BLEED valve, and drain all the oil into the container.		
18.	Set the OPERATE circuit breaker (2) on the portable oil fill and filter unit to ON.		
19.	Turn the BYPASS valve fully clockwise, and close the OIL BLEED valve when the oil stream is free of air bubbles.		
20.	Turn the RELIEF valve knob (3) until the OIL PRESSURE gage (5) indicates $100 \pm 10$ psi, and turn the locknut (13) fully clockwise.		
21.	Set the OPERATE circuit breaker to OFF when the hydraulic reservoir level indicator moves into the BLD position.		
22.	Turn the BYPASS valve and the RELIEF VALVE knob fully counterclockwise.		
23.	Perform the HPU pressure switch check as prescribed in steps <i>a</i> through <i>n</i> below.		
	<i>Note.</i> The HPU pressure switch check must be performed during assembly and at six-month intervals thereafter.		
	<i>a.</i> Remove the left equipment access cover plate, if not previously removed.		
	<i>b.</i> Disconnect connector P514 from connector J514 on the missile distribution box.		
	<i>c.</i> Prepare the multimeter to read continuity on the R X 10,000 ohms scale.		
	<i>d.</i> Place the multimeter leads across pins B and C of connector P514.		
	<b>The multimeter indicates an open circuit.</b>		
	<i>e.</i> Remove the leads from pins B & C and prepare the multimeter to read continuity on the R X 1 ohm scale. Place the leads on pins B & C of connector P514.		
	<i>Note.</i> Perform <i>f</i> below for permanent-type installation or <i>g</i> below for a mobile-type installation.		
	<i>f.</i> Set the ELECTRICAL HPU circuit breaker to ON.		
	<b>The ELECTRICAL HPU POWER indicator light illuminates.</b>		
	<b>Warning:</b> Insure that all personnel remain clear of the area surrounding the missile elevons while applying hydraulic pressure.		
	<i>g.</i> Set the circuit breaker CB2 on the distribution box at the test station truck to ON.		

Table 4-5. Hydraulic Oil Fill and System Cleanup of the Hydraulic Pumping Unit,  
using the Portable Oil Fill and Filter Unit — Continued

Step	Operation	Normal indication	Corrective procedure
23— Cont	<p><i>h.</i> Depress the ELECTRICAL HPU START pushbutton. The multimeter indicates continuity (less than 1 ohm), which verifies that the pressure switch is closed.</p> <p><i>i.</i> Depress the ELECTRICAL STOP pushbutton.</p> <p><i>Note.</i> Perform step <i>j</i> below for a permanent-type installation or step <i>k</i> below for a mobile-type installation.</p> <p><i>j.</i> Set the ELECTRICAL HPU circuit breaker to OFF.</p> <p><b>The ELECTRICAL HPU POWER indicator light extinguishes.</b></p> <p><i>k.</i> Set the circuit breaker CB2 to OFF.</p> <p><i>l.</i> Repeat steps <i>c</i> and <i>d</i> above.</p> <p><i>m.</i> Connect connector P514 to connector J514 on the missile distribution box.</p> <p><i>n.</i> Install the left equipment access cover plate if not required for subsequent checks.</p> <p><b>Caution:</b> If the cooling unit is not used in the procedures below, insure that operation of the TCG is limited to cycles not to exceed those prescribed in tables 4-7, 4-8, and 4-9.</p>		
24.	<p>At the TPCU, set the AC POWER switch to ON.</p> <p><b>The POWER ON indicator light illuminates.</b></p>		
25.	<p>At the TCU, set the POWER switch to ON.</p> <p><b>The POWER LIGHT indicator light illuminates.</b></p> <p><b>Caution:</b> Check that the weights of the INERTIA SWITCHES in the TCG are in the forward (dearmed) position.</p>		
26.	<p>Set the POWER switch on the cooling unit to ON.</p> <p><b>Caution:</b> If the GYRO UNCAGED indicator light on the TPCU illuminates, immediately operate the GYRO switch to CAGE.</p>		
27.	<p>Set the HEATERS EXTERNAL and the PLATE POWER EXTERNAL switches on the TPCU to ON.</p> <p><b>The HEATERS EXTERNAL indicator light illuminates.</b></p> <p><b>After approximately 30 seconds, the PLATE POWER EXTERNAL indicator light illuminates.</b></p>		
28.	<p>Set the ELECTRICAL HPU circuit breaker to ON.</p> <p><b>The ELECTRICAL HPU POWER indicator light illuminates.</b></p> <p><i>Note.</i> If the HPU stops automatically and the ELECTRICAL HPU HIGH TEMPERATURE indicator light on the power conversion unit or the distribution box in the test station truck illuminates, do not depress the ELECTRICAL HPU START pushbutton until the ELECTRICAL HPU HIGH TEMPERATURE light extinguishes.</p> <p><b>Caution:</b> Do not depress the PUSH TO READ DC CURRENT pushbutton when depressing the ELECTRICAL HPU START pushbutton.</p>		
29.	<p>Depress the ELECTRICAL HPU START pushbutton.</p> <p><b>The ACC. AIR PRESS. gage indicates 2700 to 3200 psi.</b></p>		
30.	<p>Depress the PUSH TO READ DC CURRENT pushbutton.</p> <p><b>The DC CURRENT METER does not exceed 120 amperes.</b></p> <p><b>The DC VOLTAGE meter indicates 27.9 to 35.6 volts.</b></p>		
31.	<p>Set the ROLL POSITION switch on the TCU to GROUND.</p>		
32.	<p>Set the TEST SELECTOR NO. 1 switch to BUZZ V, and depress the ROLL pushbutton.</p> <p><b>The NULL METER indicates within the white zone.</b></p> <p>Adjust the R-BUZZ variable resistor (D, fig. 4-25 or A, fig. 4-26) in the TCG until the NULL METER indicates 1.</p>		

Table 4-5. *Hydraulic Oil Fill and System Cleanup of the Hydraulic Pumping Unit, using the Portable Oil Fill and Filter Unit — Continued*

Step	Operation	Normal indication	Corrective procedure
33.	Depress the YAW pushbutton.	<b>The NULL METER indicates within the white zone.</b>	Adjust the Y-BUZZ variable resistor (D, fig. 4-25 or A, fig. 4-26) in the TCG until the NULL METER indicates 1.
34.	Depress the PITCH pushbutton.	<b>The NULL METER indicates within the white zone.</b>	Adjust the P-BUZZ variable resistor (A, fig. 4-25 or A, fig. 4-26) in the TCG until the NULL METER indicates 1.
35.	Set the ROLL POSITION switch to NORMAL.		
36.	Set the TEST SELECTOR NO. 1 switch to TRANS. NO. 2.		
	<p><i>Note.</i> From the rear of the missile, the trailing edges of the Y elevons deflect to the left when the YAW pushbutton is depressed and the TEST SELECTOR NO. 2 switch is set to +G, and to the right when the YAW pushbutton is depressed and the TEST SELECTOR NO. 2 switch is set to -G. The trailing edges of the P elevons deflect to the right when the PITCH pushbutton is depressed and the TEST SELECTOR NO. 2 switch is set to +G, and to the left when the PITCH pushbutton is depressed and the TEST SELECTOR NO. 2 switch is set to -G.</p>		
37.	Depress the YAW pushbutton, and alternately rotate the TEST SELECTOR NO. 2 switch between +G and -G for approximately 1 minute.	<b>The elevons deflect accordingly.</b>	
38.	Depress the PITCH pushbutton, and alternately rotate the TEST SELECTOR NO. 2 switch between +G and -G for approximately 1 minute.	<b>The elevons deflect accordingly.</b>	
39.	Set the TEST SELECTOR NO. 2 switch to TRANS. NO. 1, the TEST SELECTOR NO. 1 switch to GYRO PRESET and the PRESET-FLIGHT switch to FLIGHT.		
40.	Depress the ROLL pushbutton.		
41.	Operate the GYRO PRESET switch to CW or CCW for approximately one minute.	<b>The elevons and the NULL METER deflect accordingly, and the ACC. AIR PRESS. gage indicates 2700 to 3200 psi.</b>	
42.	Depress the ELECTRICAL HPU STOP pushbutton.		
43.	Allow the high-pressure accumulator to bleed down and the ACC. AIR PRESS. gage indication to stabilize.	<b>The ACC. AIR PRESS. gage indicates the approximate pressure as shown in the precharge list (table 4-4).</b>	
44.	Set the PLATE POWER EXTERNAL switch on the TPCU to OFF.	<b>The PLATE POWER EXTERNAL indicator light extinguishes.</b>	
45.	Set the HEATERS EXTERNAL switch to OFF.	<b>The HEATERS EXTERNAL indicator light extinguishes.</b>	
46.	Set the POWER switch on the TCU to OFF.	<b>The POWER LIGHT indicator light extinguishes.</b>	
47.	Set the POWER switch on the cooling unit to OFF.		
48.	Set the AC POWER switch on the TPCU to OFF.	<b>The POWER ON indicator light extinguishes.</b>	
49.	Open the OIL BLEED valve, and bleed all the oil from the HPU into a 2½ gallon (minimum) container.		
50.	Repeat steps 18 thru 22, 24 thru 30, and 35 thru 49 above.		

Table 4-5. *Hydraulic Oil Fill and System Cleanup of the Hydraulic Pumping Unit, using the Portable Oil Fill and Filter Unit—Continued*

Step	Operation	Normal indication	Corrective procedure
51.	Attach the quick-disconnect coupling half (fig. 4-11) to the free end of the drain hose (6, fig. 4-10), and connect this end to the quick-disconnect fitting on the manifold and return port (12) in the portable oil fill and filter unit. <i>Note.</i> If oil is visible in the oil level gage (9), sufficient oil is available for the remainder of the cleanup procedure.		
52.	Insure that the OIL BLEED valve is open. <i>Note.</i> The hydraulic reservoir level indicator should not move to FULL while performing step 53 below.		
53.	Insure that the RELIEF VALVE knob (3) and the BYPASS valve (4) are fully counterclockwise. Set the OPERATE circuit breaker (2) to ON and allow the oil to circulate for 15 minutes.		
54.	Close the OIL BLEED valve and turn the BYPASS valve (4) fully clockwise.		
55.	Turn the RELIEF VALVE knob until the OIL PRESSURE gage (5) indicates $100 \pm 10$ psi, and turn the locknut (13) fully clockwise. The hydraulic reservoir level indicator moves to FULL position.		
56.	Set the OPERATE circuit breaker (2) to OFF.		
57.	Repeat steps 22, 24 thru 30, and 36 thru 48 above.		
58.	Operate the OIL BLEED valve to allow the oil to flow to the portable oil fill and filter unit. All the oil has returned when the oil level gage indication stops increasing.		
59.	Repeat steps 52 thru 58 above 10 times.		
60.	Repeat steps 52 thru 56. <i>Note.</i> Perform step 61 below for a permanent-type installation or step 62 below for a mobile-type installation.		
61.	Set the ELECTRICAL HPU POWER circuit breaker to OFF. The ELECTRICAL HPU POWER indicator light extinguishes.		
62.	Set the circuit breakers CB2, CB6, CB7, and CB9 to OFF.		
63.	Set the ETO APS RUNUP MOTOR circuit breaker to OFF for permanent-type installation or the circuit breaker CB4 to OFF for mobile-type installation. The LINE POWER indicator light extinguishes.		
64.	Disconnect the drain hose (6) from the quick-disconnect fitting on the manifold return port. Remove the quick-disconnect coupling half connected in step 51.		
65.	Disconnect the hydraulic oil supply hose (7) from the OIL FILL valve, and connect it to the quick-disconnect fitting on the manifold return port (12).		
66.	Disconnect the drain hose from the oil bleed port on the HPU.		
67.	Install the overboard dump tube on the oil bleed port.		

Table 4-6. *Hydraulic Oil Fill and System Bleed of the Hydraulic Pumping Unit, using Hydraulic Test Stand M14*

Step	Operation	Normal indication	Corrective procedure
	<i>Note.</i> These procedures will be used only by units which have not been issued a portable oil fill and filter unit.		
1.	Perform the procedures in table 4-5, steps 1, 2 or 3, and 4.		
2.	Install the bayonet fitting (A, fig. 4-11), on the end of the hydraulic test stand oil supply hose, to the oil fill valve.		

Table 4-6. Hydraulic Oil Fill and System Bleed of the Hydraulic Pumping Unit,  
using Hydraulic Test Stand M14 — Continued

Step	Operation	Normal indication	Corrective procedure
3.	Connect the strap on the oil fill valve to the bayonet fitting, on the hydraulic test stand oil supply hose, and secure together with the hexagon-head cap screw (B, fig. 4-11) and lockwasher.		
4.	Energize the hydraulic test stand (fig. 4-12) by depressing START switch.		
5.	Turn the BYPASS VALVE knob on the hydraulic test stand fully clockwise.		
6.	Turn the knob on the oil fill valve fully counterclockwise.		
7.	Cover the quick-disconnect fitting (2, fig. 4-17) on the hydraulic oil supply hose with a cloth or other suitable material to prevent spraying of hydraulic oil on operating personnel. Hold the end of the hose over a 2½ gallon (minimum) container, and crack the coupling nut (3, fig. 4-17) at the quick-disconnect fitting. Observe the flow of oil. When the flow is free of air bubbles and only a stream of clear oil is visible, tighten the coupling nut.		
8.	Turn the knob on the oil fill valve fully clockwise.		
9.	Turn the BYPASS VALVE knob on the hydraulic test stand fully counterclockwise.		
10.	Depress the STOP switch on the hydraulic test stand.		
	<b>Caution:</b> Avoid spilling oil on the fin seals.		
11.	Connect the quick-disconnect fitting on the hydraulic oil supply hose to the OIL FILL valve (6, fig. 4-17) on the HPU indicator panel (1).		
12.	Connect a drain hose to the overboard dump tube. Place the other end of the drain hose into a 2½ gallon (minimum) container.		
13.	Energize the hydraulic test stand by depressing the START switch.		
14.	Turn the BYPASS VALVE knob fully clockwise.		
15.	Open the OIL BLEED valve on the indicator panel. Drain the reservoir until oil ceases to flow from the drain hose.		
16.	Slowly turn the knob on the oil fill valve counterclockwise until oil flows from the drain hose. Close the OIL BLEED valve when the oil is free of air bubbles.		
17.	When the hydraulic reservoir level indicator starts to move, begin turning the knob on the oil fill valve clockwise so that the valve is closed by the time the hydraulic reservoir level indicator moves into the BLD position.		
	<b>Warning:</b> Insure that all personnel remain clear of the area surrounding the missile elevons while applying hydraulic pressure.		
	<b>Caution:</b> Oil drained from the HPU must not be reused in the HPU.		
17.1	Perform the procedures in table 4-5, step 23.		
18.	Loosen the six captive screws that secure the access cover plate to the TCG sufficiently to ensure depletion of air pressure. Remove the cover plate, and allow it to hang by the chain.		
	<b>Note.</b> Perform step 19 below for a permanent-type installation or step 20 below for a mobile-type installation.		
19.	Set the ELECTRICAL HPU POWER circuit breaker on the power conversion unit (fig. 4-14) to ON.		
	<b>The ELECTRICAL HPU POWER indicator light illuminates.</b>		
20.	Set the circuit breakers CB2, CB6, CB7, and CB9 on the distribution box in the test station truck to ON.		
	<b>Caution:</b> Check that the weights of the INERTIA SWITCHES in the TCG are in the forward (dearmed) position.		

Table 4-6. Hydraulic Oil Fill and System Bleed of the Hydraulic Pumping Unit,  
using Hydraulic Test Stand M14 — Continued

Step	Operation	Normal indication	Corrective procedure
	<p><b>Caution:</b> If the cooling unit is not used in the procedures below, be sure that operation of the TCG is limited to cycles not to exceed those prescribed in tables 4-7, 4-8, and 4-9.</p>		
21.	Set the POWER switch on the cooling unit to ON.		
	<p><b>Caution:</b> If the GYRO UNCAGE indicator light on the TPCU illuminates, immediately operate the GYRO switch to CAGE.</p>		
21.1	Set the AC POWER switch on the TPCU to ON.		
	The POWER ON indicator light illuminates.		
21.2	Set the POWER switch on the TCU to ON.		
	The POWER LIGHT indicator light illuminates.		
22.	Set the HEATERS EXTERNAL and the PLATE POWER EXTERNAL switches on the TPCU to ON.		
	The HEATERS EXTERNAL indicator light illuminates. After approximately 30 seconds, the PLATE POWER EXTERNAL indicator light illuminates.		
	<p><b>Note.</b> If the HPU stops automatically and the ELECTRICAL HPU HIGH TEMPERATURE indicator light on the power conversion unit or the distribution box in the test station truck illuminates, do not depress the ELECTRICAL HPU START pushbutton until the ELECTRICAL HPU HIGH TEMPERATURE indicator light extinguishes.</p>		
	<p><b>Caution:</b> Do not depress the PUSH TO READ DC CURRENT pushbutton when depressing the ELECTRICAL HPU START pushbutton.</p>		
23.	Depress the ELECTRICAL HPU START pushbutton.		
	The ACC. AIR PRESS. gage (2, fig. 4-18) indicates 2700 to 3200 psi.		
24.	Depress the PUSH TO READ DC CURRENT pushbutton.		
	The DC CURRENT meter does not exceed 120 amperes. The DC VOLTAGE meter indicates 27.9 to 35.6 volts.		
25.	Set the ROLL POSITION switch on the TCU to GROUND.		
26.	Set the TEST SELECTOR NO. 1 switch to BUZZ V., and depress the ROLL pushbutton.		
	The NULL METER indicates within the white zone.		
	Adjust the R-BUZZ variable resistor (D, fig. 4-25 or A, fig. 4-26) in the TCG until the NULL METER indicates 1.		
27.	Depress the YAW pushbutton.		
	The NULL METER indicates within the white zone.		
	Adjust the Y-BUZZ variable resistor (D, fig. 4-25 or A, fig. 4-26) in the TCG until the NULL METER indicates 1.		
28.	Depress the PITCH pushbutton.		
	The NULL METER indicates within the white zone.		
	Adjust the P-BUZZ variable resistor (A, fig. 4-25 or A, fig. 4-26) in the TCG until the NULL METER indicates 1.		
29.	Set the ROLL POSITION to NORMAL.		
30.	Set the TEST SELECTOR NO. 1 switch to TRANS. NO. 2		

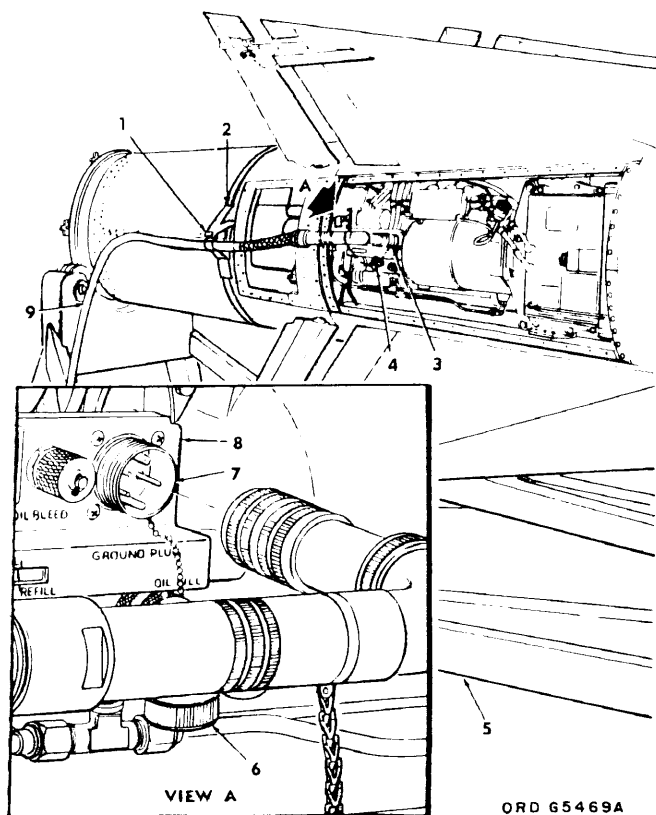
Table 4-6. *Hydraulic Oil Fill and System Bleed of the Hydraulic Pumping Unit, using Hydraulic Test Stand M14 — Continued*

Step	Operation	Normal indication	Corrective procedure
	<p><i>Note.</i> From the rear of the missile, the trailing edges of the Y elevons deflect to the left when the YAW pushbutton is depressed and the TEST SELECTOR NO. 2 switch is set to +G, and to the right when the YAW pushbutton is depressed and the TEST SELECTOR NO. 2 switch is set to -G. The trailing edges of the P elevons deflect to the right when the PITCH pushbutton is depressed and the TEST SELECTOR NO. 2 switch is set to +G, and to the left when the PITCH pushbutton is depressed and the TEST SELECTOR NO. 2 switch is set to -G.</p>		
31.	<p>Depress the YAW pushbutton, and alternately rotate the TEST SELECTOR NO. 2 switch between +G and -G for approximately one minute.</p> <p><b>The elevons deflect accordingly.</b></p>		
32.	<p>Depress the PITCH pushbutton, and alternately rotate the TEST SELECTOR NO. 2 switch between +G and -G for approximately one minute.</p> <p><b>The elevons deflect accordingly.</b></p>		
33.	<p>Set the TEST SELECTOR NO. 2 switch to TRANS. NO. 1, the TEST SELECTOR NO. 1 switch to GYRO PRESET, and the PRESET-FLIGHT switch to FLIGHT.</p>		
34.	<p>Depress the ROLL pushbutton.</p>		

Table 4-6. Hydraulic Oil Fill and System Bleed of the Hydraulic Pumping Unit,  
Using Hydraulic Test Stand M14—Continued

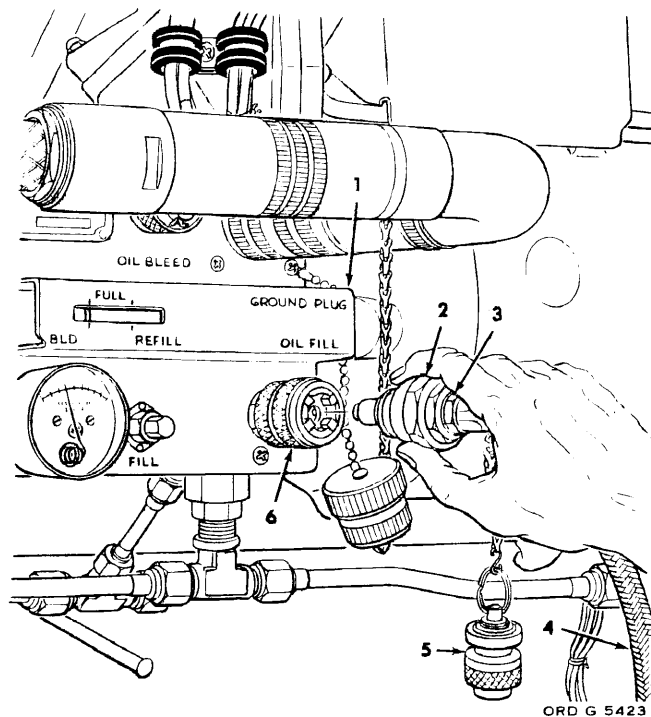
Step	Operation	Normal indication	Corrective procedure
35	Operate the GYRO PRESET switch to CW or CCW for approximately one minute.	The elevons and Null METER deflects accordingly and the accumulator air pressure gage indicates 2,700 to 3,200 psi.	
36	Depress the ELECTRICAL HPU STOP pushbutton.		
	<i>Note.</i> Perform step 37 below for a permanent-type installation, step 38 below for a mobile-type installation.		
37	Set the ELECTRICAL HPU POWER circuit breaker on the power conversion unit to OFF.	The ELECTRICAL HPU POWER indicator light extinguishes.	
38	Set circuit breaker CB2 on the distribution box in the test station truck to OFF.		
39	Allow the high-pressure accumulator to bleed down and the accumulator air pressure gage indication to stabilize.	The accumulator air pressure gage indicates the approximate pressure as shown in the precharge list (table 4-4).	
40	Set the PLATE POWER EXTERNAL switch on the TPCU to OFF.	The PLATE POWER EXTERNAL indicator light extinguishes.	
41	Set the HEATERS EXTERNAL switch to OFF.	The HEATERS EXTERNAL indicator light extinguishes.	
42	Set the POWER switch on the cooling unit to OFF.		
43	Set POWER switch on the TCU to OFF.	POWER LIGHT indicator light extinguishes.	
44	Set AC POWER switch on the TPCU to OFF.	POWER ON indicator light extinguishes.	
	<i>Note.</i> Perform step 45 below for a mobile-type installation.		
45	Set circuit breakers CB6, CB7, and CB9 to OFF.		
46	Open the OIL BLEED valve on the HPU indicator panel and observe that the hydraulic oil is free of air bubbles. Close the OIL BLEED valve.		
47	Slowly turn the knob on the oil fill valve counterclockwise.		
48	When the hydraulic reservoir level indicator starts to move, begin turning the knob on the oil fill valve clockwise so that the valve is closed by the time the hydraulic reservoir level indicator moves into the BLD position.		
49	Slowly open the OIL BLEED valve on the HPU indicator panel. Bleed the oil until the hydraulic reservoir level indicator moves into FULL position, and close the OIL BLEED valve.	Oil stream is free of bubbles.	If the oil stream is not free of air bubbles, repeat steps 19 through 49.
50	(deleted)		
51	Turn the BY-PASS VALVE (fig. 4-12) on the hydraulic test stand fully counterclockwise.		
52	Depress the STOP switch on the hydraulic test stand.		
53	Disconnect the hydraulic oil supply hose (4, fig. 4-17) from the OIL FILL valve (6).		
54	Disconnect the drain hose from the overboard dump tube.		





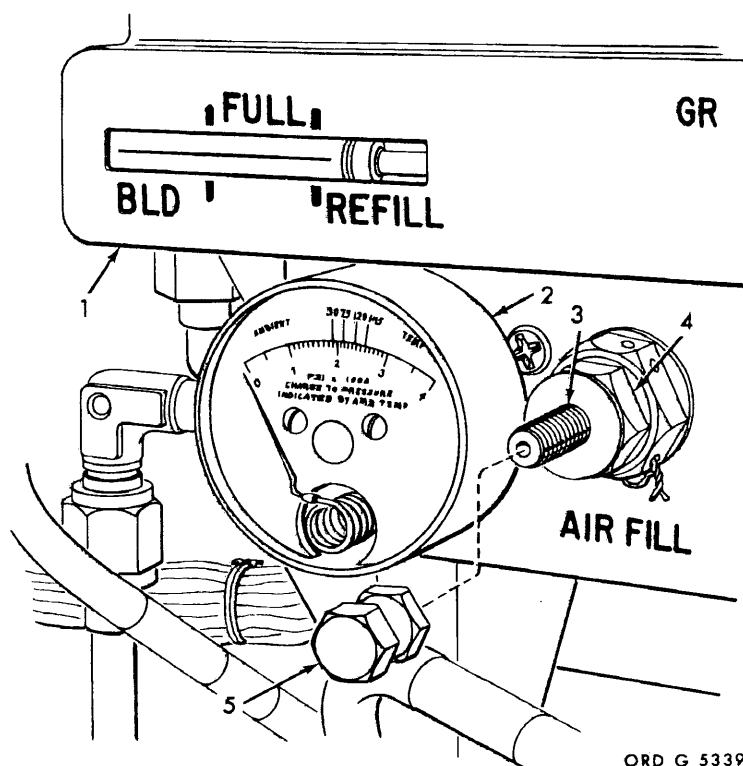
- 1—Cable retainer assembly
- 2—Buckle and strap
- 3—Connector P546
- 4—P546 protective cap
- 5—Missile body truck
- 6—GROUND PLUG protective cap
- 7—GROUND PLUG connector J546
- 8—Indicator panel
- 9—HPU power cable assembly

Figure 4-16. Disconnection and connection of the HPU power cable assembly.



- 1—HPU indicator panel
- 2—Quick-disconnect fitting
- 3—Coupling nut
- 4—Hydraulic oil supply hose
- 5—Plug cap
- 6—OIL FILL valve

Figure 4-17. Removal and installation of the hydraulic oil supply hose.



- 1 — Indicator panel
- 2 — Accumulator air pressure gage
- 3 — AIR FILL valve
- 4 — AIR FILL valve locknut
- 5 — AIR FILL valve cap

Figure 4-18. HPU-accumulator air pressure gage and AIR FILL valve.

### Section III. MISSILE ELECTRICAL CHECKOUT

**Caution:** Observe the operating cycles indicated in tables 4-7, 4-8, and 4-9 when the transponder control group is energized.

**Note.** If NULL METER indicates full-scale deflection at any time during the following procedures, the needle remains at full right or left scale deflection until the RESET pushbutton is depressed.

**Note.** If the HPU stops automatically and ELECTRICAL HPU HIGH TEMPERATURE indicator light on the power conversion unit or the distribution box in the test station truck illuminates, do not depress ELECTRICAL HPU START pushbutton until ELECTRICAL HPU HIGH TEMPERATURE indicator light extinguishes. If the HPU stops automatically again before completing the procedure below, allow the HPU to cool for 1 hour before depressing ELECTRICAL HPU START pushbutton and continuing with the test.

Table 4-7. Operating Cycles for the Transponder-Control Groups without the Cooling Unit during Ground Operating Procedures

Ambient temperature (°F)	Missile exposed to solar radiation				Missile shaded from solar radiation or at night	
	White		Green <sup>1</sup>		All colors	
	Transponder operating cycles in minutes					
	On	Off	On	Off	On	Off
Below 80°	20	40	15	20	30	40

<sup>1</sup>See footnote at end of table.

Table 4-7. Operating Cycles for the Transponder-Control Groups without the Cooling Unit during Ground Operating Procedures — Continued

Ambient temperature (°F)	Missile exposed to solar radiation				Missile shaded from solar radiation or at night	
	White		Green <sup>1</sup>		All colors	
	Transponder operating cycles in minutes					
	On	Off	On	Off	On	Off
80° to 100°	10	20	8	20	20	40
	15	45				
	20	90				
100° to 125°					10	40

<sup>1</sup> Military specification MIL-E-46061 (NO).

Table 4-8. Operating Cycles for the Transponder-Control Groups using the Cooling Unit in a White Missile during Ground Operating Procedures

Ambient temperature (°F)	Missile exposed to solar radiation			Missile shaded from solar radiation or at night (all colors)		
	Transponder operating cycles in minutes					
	Initial operation <sup>1</sup>	After initial operation		Initial operation <sup>1</sup>	After initial operation	
	On	Off	On	On	Off	On
Below 100°	Continuous			Continuous		
100° to 110°	40	10	10	Continuous		
110° to 125°	30	15	7	40	10	10

<sup>1</sup> A 2-hour cooling period (off condition) will reestablish conditions for initial operation.

Table 4-9. Running Periods for the Transponder-Control Groups using the Cooling Unit in a Camouflage-Painted Missile Exposed to Solar Radiation

Solar exposure hours <sup>1</sup>	Ambient temperature, °F <sup>2</sup>				
	80°	90°	100°	110°	125°
	Green <sup>3</sup>	Green <sup>3</sup>	Green <sup>3</sup>	Green <sup>3</sup>	Green <sup>3</sup>
	Transponder running period in minutes <sup>1</sup>				
0	Continuous	90	90	60	40
2		73	44	29	20
4		65	32	21	11
6		55	25	15	6
8		47	21	11	5
10		42	20	11	4

<sup>1</sup> Continuous exposure measured from sunrise.<sup>2</sup> Maximum temperature expected during a specific day, based on locality.<sup>3</sup> Military specification MIL-E-46061 (NO).<sup>4</sup> A 2-hour cooling period (off condition) will reestablish conditions for the listed running periods.

#### 4-12. Test Equipment

The test equipment necessary to perform the missile electrical checkout is listed below.

- a. The missile electrical test set group.
- b. The power conversion unit (permanent-type installation) or the distribution box in the

mobile test unit (mobile-type installation).

- c. The air leakage test set.
- d. A source of clean, dry compressed air or nitrogen (regulated 200 psi maximum).
- e. The assembly area missile RF test set group.

Table 4-10. Alinement of the HERCULES Missile RF Test Set Group

Step	Operation	Normal indication	Corrective procedure
1.	Alinement of the power supply:		
	a. Set the TEST SELECTOR switch to CAL, the CALIBRATE switch to ADJ, and the FAILSAFE TEST—CONTACT—NORMAL TIME switch to NORMAL.		
	b. Set the AC POWER switch to ON.		
	c. After 60 seconds, momentarily operate the RESPONSE—-250V switch to -250V.		
		<b>The RESPONSE OR VOLTAGE meter deflects to the right.</b>	Immediately set the AC POWER switch to OFF.
	d. Set the CALIBRATE switch to TEST, and allow 30 minutes to warm up.		
	e. Set the PWR METER CAL switch to ADJ V and the CALIBRATE switch to ADJ.		
	f. Adjust the CAL V knob until the RF POWER meter indicates V (right end of meter scale).		
	g. Operate the RESPONSE—-250V switch to -250V.		
		<b>The RESPONSE OR VOLTAGE meter indicates ADJ VOLTS (80 on the meter scale).</b>	Adjust the ADJ -250V variable resistor until the RESPONSE OR VOLTAGE meter indicates ADJ VOLTS.
	h. Release the RESPONSE—-250V switch.		
	i. Operate the BALANCE switch to -250V.		
		<b>The BALANCE meter indicates 0 (center of the meter scale).</b>	Adjust the ADJ -250V variable resistor until the BALANCE meter indicates 0.
	j. Release the BALANCE switch.		
		<b>The BALANCE meter indicates on scale.</b>	Adjust the V.D. ADJ variable resistor until the BALANCE meter indicates 0.
2.	Alinement of the microsecond oscillator:		
	a. Set the CALIBRATE switch to ADJ.		
	b. Set the TIME - MICROSECONDS switches to any whole value.		
	<i>Note.</i> When reference is made to this step from subsequent steps, use the value as required. If a fractional value is required, set the TIME-MICROSECONDS switches to the nearest whole value, and, following c below, set in the fraction.		
	c. Observe the oscilloscope presentation. Adjust the TIME variable resistor for a pattern (A, fig. 4-19) either stationary or repeating itself less than twice per second.		
3.	Alinement of the RF power meter:		
	a. Adjust the ATTEN-DB knob until the ATTEN-DB dial indicates 30 or greater.		
	b. Set the TEST SELECTOR switch to RF TEST SIG and the PWR METER CAL switch to ADJ $\infty$ .		
	c. Adjust the CAL $\infty$ knob until the RF POWER meter indicates within one-quarter of an inch or less of the left end of the meter scale.		

Table 4-10. Alinement of the HERCULES Missile RF Test Set Group — Continued

Step	Operation	Normal indication	Corrective procedure
3— Cont	d. Set the PWR METER CAL switch to ADJ 0. e. Adjust the CAL 0 knob until the RF POWER meter indicates 0 (right end of the meter scale). f. Repeat a through e above until no further adjustment is necessary.		
4.	Calibration of the RF test signal frequency: a. Adjust the ATTEN-DB knob until the ATTEN-DB dial indicates 30 or greater. b. Set the TIME-MICROSECONDS switches to 00.00 and the TEST SELECTOR switch to RF TEST SIG. b.1. Turn the OUTPUT knob fully clockwise. c. Set the PWR METER CAL switch to MEAS. <b>The attenuators click audibly.</b> e. Adjust the ATTEN-DB knob until the RF POWER meter indicates between 2 and 0, or until the ATTEN-DB dial indicates 0. f. Adjust the REPELLER knob for a maximum indication on the RF POWER meter (right end of the meter scale). Use the ATTEN-DB knob to keep the RF POWER meter indication between 2 and 0. g. Adjust the MEAS FREQ knob for a maximum dip to the left on the RF POWER meter. Adjust the MEAS FREQ knob for the exact low point of the dip. h. Determine the test frequency from the calibration chart on the test set, and compare the test set frequency with the assigned frequency. <b>The measured test frequency is within 5 megacycles of the assigned frequency.</b>  If the measured frequency is above the assigned value, turn the FREQ knob several degrees clockwise. Repeat e through h above. If the measured frequency is below the assigned value, turn the FREQ knob several degrees counterclockwise. Repeat e through h above. i. Turn the MEAS FREQ knob a minimum of three turns in either direction. j. Set the TIME-MICROSECONDS switches to 04.00. <b>The RF POWER meter indicates within one-half of an inch of ∞ (left end of the scale).</b> k. Adjust the ATTEN-DB knob until the RF POWER meter indicates between 2 and 0. l. Adjust the MEAS FREQ knob for a maximum dip to the left on the RF POWER meter. Adjust the MEAS FREQ knob for the exact low point of the dip. m. Determine the frequency from the calibration chart on the test set. <b>The frequency must be within 15 megacycles of that recorded in h above.</b> Repeat a through m above. n. Turn the MEAS FREQ knob fully counterclockwise.		
5.	Alinement of the RF test signal power output: a. Set the TEST SELECTOR switch to RF TEST SIG, the PWR METER CAL switch to MEAS, and the TIME-MICROSECONDS switches to 04.00. b. Simultaneously adjust the ATTEN-DB knob and the OUTPUT knob until the RF POWER meter indicates 0 (right end of the meter scale) and the ATTEN-DB dial indicates 0.		
6.	Alinement of the sawtooth circuit: a. Set the TEST SELECTOR switch to CAL. b. Aline the microsecond oscillator for 17.50 microseconds (refer to step 2).		

Table 4-10. Alinement of the HERCULES Missile RF Test Set Group — Continued

Step	Operation	Normal indication	Corrective procedure
6— Cont	c. Set the CALIBRATE switch to P&Y, the PITCH switch to -7G, and the YAW switch to +7G.		
		<b>The COM GATE-PITCH and the COM GATE-YAW indicator lights are illuminated.</b>	
	d. Observe the oscilloscope presentation. Set the SCOPE WIDTH adjustment to obtain a 2-inch sweep. Adjust the MISSILE CODE (DELAY) knob until the pulses are centered on the oscilloscope sweep.		
		<b>The two pulses must be vertically alined at the starting point of their leading edge (B, fig. 4-19).</b>	
		<i>Note.</i> The leading edge has a sharp rise and may face either to the left or the right.	
		Adjust the S.T. ADJ variable resistor until the pulse starting points are vertically alined.	
	e. Set the PITCH switch to +7G and the YAW switch to -7G.		
		<b>The pulses remain vertically alined within one-eighth of an inch of vertical alinement with a 2-inch oscilloscope sweep.</b>	
		Adjust the S.T. ADJ variable resistor to bring the pulses halfway back to vertical alinement.	
	f. Set the PITCH switch to -7G and the YAW switch to +7G.		
		<b>The pulses remain vertically alined within one-eighth of an inch of vertical alinement with a 2-inch oscilloscope sweep.</b>	

1

1000

1000

Table 4-10. Alinement of the HERCULES Missile RF Test Set Group—Continued

Step	Operation	Normal indication	Corrective procedure
6 Cont			Adjust the S.T. ADJ variable resistor to bring pulses halfway back to vertical alinement and repeat <i>c</i> through <i>f</i> above.
	<i>g.</i> Aline the microsecond oscillator for 09.00 microseconds (refer to step 2). <i>h.</i> Set the CALIBRATE switch to PITCH. <i>i.</i> Set the PITCH switch to -7G and the YAW switch to OG. <i>j.</i> Position the MISSILE CODE (DELAY) dial to 23.50. <i>k.</i> Observe the oscilloscope presentation. The two pulses must be vertically alined at the starting point of their leading edge (C, fig. 4-19).		
			Adjust the V.D. ADJ variable resistor for pulse alinement. Repeat <i>a</i> through <i>k</i> above until no further adjustment is necessary.
7	Alinement of D2 delay and response time A: <i>a.</i> Set the TEST SELECTOR switch to CAL, the YAW switch to -7G, and the PITCH switch to FINS. <i>b.</i> Aline the microsecond oscillator for the missile code +2 microseconds (refer to step 2). <i>c.</i> Set the CALIBRATE switch to Y & #4 RESP. A. Turn the RESPONSE TIME MILLI-MICROSECONDS handwheel fully clockwise. <i>d.</i> Set the D2 DELAY COARSE switch to nearest value below missile code +2 microseconds (see chart below).		
	Switch position	Value	
	A . . . . .	0.5	
	B . . . . .	7	
	C . . . . .	14	
	D . . . . .	22	
	<i>e.</i> Subtract the D2 DELAY COARSE value determined in <i>d</i> above from the missile code +2 microseconds. <i>f.</i> Adjust the D2 DELAY FINE knob until the D2 DELAY FINE dial indicates the value determined in <i>e</i> above. <i>g.</i> Set the SCOPE BRIGHTNESS knob for sharpest possible oscilloscope presentation. <i>h.</i> Observe oscilloscope presentation. Adjust the FINS knob to separate clearly the moveable pulse from the remaining two pulses (D and E, fig. 4-19). Turn the MISSILE CODE (DELAY) knob a few degrees CW to center pulse on oscilloscope sweep (D and E). <i>i.</i> Observe the oscilloscope presentation. Adjust the D2 DELAY FINE knob so that the remaining two pulses are in coincidence slightly above the starting point (approximately 90-percent amplitude of their leading edge). <i>j.</i> Set the PITCH switch to OG, the YAW switch to OG, and the CALIBRATE switch to TRAIN.		
	Three pulses or pulse groups are visible on the oscilloscope.		



Table 4-10. Alinement of the HERCULES Missile RF Test Set Group—Continued

Step	Operation	Normal indication	Corrective procedure
7 Cont	<p>k. Observe the oscilloscope presentation. Turn the MISSILE CODE (DELAY) knob a few degrees CW or CCW to separate clearly the moveable pulse from the stationary pulse.</p> <p style="text-align: center;"><b>One pulse group (nos. 1 and 2 pulses) remains stationary and appears in coincidence.</b></p> <p>l. Adjust the MISSILE CODE (DELAY) knob until both moveable pulse groups are to the right of the stationary pulse group. Identify center pulse group (Y no. 3, Y no. 4, and P no. 4 pulses) (F, fig. 4-19), adjust the MISSILE CODE (DELAY) knob until this pulse group is centered on the oscilloscope sweep.</p> <p>m. Set the PITCH switch to FINS.</p> <p>n. Observe the oscilloscope presentation. Adjust the FINS knob to separate the clearly movable pulse (part of the pulse group identified in l above) from the remaining two pulses (Y no. 3 and Y no. 4 pulses).</p> <p style="text-align: center;"><b>The remaining two pulses are in exact coincidence.</b></p> <p style="text-align: right;">Adjust the D2 DELAY FINE knob until the pulses are in exact coincidence.</p> <p>o. Set the CALIBRATE switch to Y &amp; #4 RESP. A.</p> <p>p. Adjust the RESPONSE knob until the RESPONSE OR VOLTAGE meter indicates 80, or until the RESPONSE knob is fully clockwise.</p> <p>q. Rotate the RESPONSE TIME MILLI-MICROSECONDS handwheel for a maximum indication on the RESPONSE OR VOLTAGE meter. Keep the meter indication on scale by use of the RESPONSE knob, and continue until peak is attained.</p> <p>r. Adjust the RESPONSE knob until the RESPONSE OR VOLTAGE meter indicates 80.</p> <p>s. Rotate the RESPONSE TIME MILLI-MICROSECONDS handwheel in a clockwise direction until the RESPONSE OR VOLTAGE METER indicates 60. Record value indicated on the RESPONSE TIME MILLI-MICROSECONDS dial.</p> <p>t. Rotate the RESPONSE TIME MILLI-MICROSECONDS handwheel in a counterclockwise direction until the RESPONSE OR VOLTAGE meter indicates maximum and then drops to 60. Record value indicated on the RESPONSE TIME MILLI-MICROSECONDS dial.</p> <p>u. Add the values recorded in s and t above. Divide the total by two. The value obtained is response time A in millimicroseconds.</p> <p style="text-align: center;"><b>Response time A is 50 to 140 millimicroseconds.</b></p> <p>v. Turn the response knob fully counterclockwise.</p>		
8	<p>Final alinement of sawtooth circuits and check of steering command accuracy:</p> <p>a. Aline the microsecond oscillator for 17.50 microseconds (refer to step 2 above).</p> <p>b. Set the CALIBRATE switch to TRAIN, the PITCH switch to OG, and the YAW switch to OG.</p> <p>c. Adjust the MISSILE CODE (DELAY) knob to the missile code.</p> <p>d. Observe the oscilloscope presentation.</p> <p style="text-align: center;"><b>Four pulses or pulse groups are visible on oscilloscope.</b></p> <p style="text-align: center;"><i>Note.</i> The first and second pulse groups are approximately coincident and may appear as one pulse.</p> <p>e. Adjust the MISSILE CODE (DELAY) knob to separate clearly the first and second pulse groups (G, fig. 4-19).</p> <p style="text-align: center;"><b>The pulses of the second pulse group (P no. 4 and Y no. 4 pulses are coincident.</b></p>		

Table 4-10. Alinement of the HERCULES Missile RF Test Set Group—Continued

Step	Operation	Normal indication	Corrective procedure
8 Cont			Adjust the S. T. BAL variable resistor until the pulses are coincident.
	f. Adjust the MISSILE CODE (DELAY) knob to the missile code.	The first and second pulse groups are coincident.	Adjust the S. T. ADJ variable resistor until the first and second pulse groups are as close to coincidence as possible.
	g. Set the PITCH switch to -7G and the YAW switch to -7G.	The first and second pulse groups are coincident.	Adjust the V. D. ADJ variable resistor until the first and second pulse groups are as close to coincidence as possible. Repeat b through g.
	h. Set the PITCH switch to OG and then to -7G.	The first and second pulse groups are coincident for both switch positions.	Adjust the V. D. ADJ variable resistor until the first and second pulse groups are close to coincidence as possible for both switch positions.
	i. Set the PITCH switch to OG and YAW switch to OG.	The first and second pulse groups are coincident.	Adjust the S. T. ADJ variable resistor for coincidence.
	j. Set the YAW switch to -7G.	The first and second pulse groups are coincident.	Adjust the S. T. ADJ variable resistor until pulses are coincident. Repeat h and i above and j until the first and second pulse groups are as close to coincidence as possible.
	k. Set the YAW switch to +7G.		
	l. Turn the FINS knob fully clockwise.		
	Note. If the FINS knob does not remain in the fully clockwise position, hold it in the fully clockwise position while performing step 8m.		
	m. Observe the oscilloscope presentation. Set the YAW switch to FINS.	Coincidence between the first and second pulse groups does not change.	
	n. Set the YAW switch to +7G.		
	o. Observe the oscilloscope presentation. Turn the MISSILE CODE (DELAY) knob a few degrees counterclockwise, and identify the pulse (Y no. 4 pulse) that moves away from the second pulse group.		



Table 4-10. Alinement of the HERCULES Missile RF Test Set Group — Continued

Step	Operation	Normal indication	Corrective procedure
8— Cont.	p. Adjust the MISSILE CODE (DELAY) knob until the pulse identified in o above is coincident with the first pulse group. <b>The MISSILE CODE (DELAY) dial indicates within <math>\pm 0.25</math> microsecond of the missile code.</b> Repeat steps 7 and 8.		

Table 4-11. Missile Electrical Checks

Step	Operation	Normal indication	Corrective procedure
1.	Aline the missile RF test group (table 4-10).		
2.	Aline the RF test set group microsecond oscillator for the missile code.		
3.	(Deleted)		
4.	Set the TEST SELECTOR switch to REC SENS, the CALIBRATE switch to TEST, and the ATTEN-DB dial to 0. <i>Note.</i> Perform 5 below for missiles with an APS.		
5.	Perform the arm safety check (para 4-6).		
6.	Set the TEST SELECTOR NO. 2 switch to TRANS. NO. 1 and the TEST SELECTOR NO. 1 switch to OFF.		
7.	Remove the self-locking pins and rotate the forward body section to the normal flight position. Install the self-locking pins.		
8.	Set the AC POWER switch on the TPCU to ON, and the POWER switch on the TCU to ON. <b>The POWER ON indicator light on the TPCU and the POWER LIGHT indicator on the TCU illuminate.</b> <i>Note.</i> Perform steps 9 and 10 for missiles 10206 through 11935 or step 11 for missiles 13001 and subsequent.		
9.	Remove the air filter from the INERTIA SWITCH adjustment port on the TCG. Insert a stubby screwdriver through the port; move the switch arm to the rear (armed) position; then move the switch arm to the forward (safe) position.		
10.	Install the air filter on the INERTIA SWITCH adjustment port.		
11.	Insure that the INERTIA switches S1 and S2 are in the forward (dearmed) position.		
12.	Operate the GYRO switch to CAGE, and hold.		
13.	Set the HEATERS EXTERNAL switch to ON, and release the GYRO switch. <b>The HEATERS EXTERNAL indicator light illuminates.</b> <b>The GUIDANCE SECTION OPERATING TIME indicator starts timing.</b> <b>The GYRO FREQ. NO GO indicator light illuminates (missiles 10206 through 11935).</b> <b>The GYRO FREQ. GO indicator light illuminates (missiles 13001 and subsequent).</b> <b>The DELAY LINE indicator light illuminates within 3 minutes (missiles 13001 and subsequent).</b>		
14.	Set the POWER switch on the cooling unit to ON.		
15.	Set the PLATE POWER EXTERNAL switch to ON. <b>The PLATE POWER EXTERNAL indicator light illuminates.</b>		
16.	Set the TEST SELECTOR NO. 1 switch to 5V REF. <b>The NULL METER indicates within one-sixteenth of an inch of the small white mark on the right side of the scale.</b> <i>Note.</i> Failure to meet the tolerance indicates a malfunction in the TCU.		
17.	Set the TEST SELECTOR NO. 1 switch to MISSILE V. <b>The NULL METER indicates within the white zone.</b>		

Table 4-11. Missile Electrical Checks — Continued

Step	Operation	Normal indication	Corrective procedure
	<i>Note.</i> Perform step 18 for missiles 13684 and subsequent.		
18.	Disconnect the connectors P542 and P543 from the connectors on the dummy batteries.		
19.	Set the TEST SELECTOR NO. 1 switch to MISSILE 1.		
	<b>The NULL METER indicates within the white zone (missiles 10206 through 11935), or within the white zone or left black zone (missile 13001 and subsequent).</b>		
	<i>Note.</i> Perform step 20 for missiles 13684 and subsequent.		
20.	Connect P542 and P543 to the dummy batteries.		
21.	Check the TCG power supply.		
	<i>Note.</i> Perform <i>a</i> through <i>c</i> below only for missiles 13001 and subsequent.		
	<i>a.</i> Set the TEST SELECTOR NO. 1 switch to TRANS. NO. 2.		
	<i>b.</i> Set the TEST SELECTOR NO. 2 switch to FIL V.		
	<b>The NULL METER indicates within the white zone.</b>		
	If the NULL METER does not indicate within the white zone, adjust R4 (Fil Volt Adj.) on the radio set power supply (A-2).		
	<i>c.</i> Set the TEST SELECTOR NO. 2 switch to TRANS. NO. 1.		
	<i>Note.</i> Disregard the 300V test on TCG 9017425 and the 240V test on missiles 13001 and subsequent.		
	<i>d.</i> Set the TEST SELECTOR NO. 1 switch to the following positions in order: -75V; 150V; 240V; 300V; GYRO VOLTS; CONT. SIG. V; STRG. PL. V; CONT. SIG. BAL.; and STRG. PL. BAL.		
	<b>The NULL METER indicates within the white zone.</b>		
	If the NULL METER does not indicate within the white zone when selecting -75V, 150V, 240V, and 300V, adjust R10 (B+ Volt Adj) on the radio set power supply (A-2). When selecting CONT SIG BAL, adjust R5 (CS Bal Adj) on the radio set power supply (A-2). When selecting GYRO VOLTS, adjust R5 (Freq. Adj) on the transistor osc. converter (A1).		
	<i>e.</i> Set the TEST SELECTOR NO. 1 switch to CONT. SIG BAL., and depress the sensitivity switch.		
	<b>The NULL METER indicates within the white zone.</b>		
22.	Measure the receiver sensitivity.		
	<i>Note.</i> Perform <i>a</i> , <i>b</i> , and <i>c</i> below if 15 minutes have elapsed since the RF test set was aligned.		
	<i>a.</i> Aline the RF POWER meter (table 4-10).		
	<i>b.</i> Aline the RF test signal frequency and the RF test signal power output (table 4-10).		
	<i>c.</i> Aline the RFTS microsecond oscillator for the missile code.		
	<i>d.</i> Insure that the MISSILE CODE (DELAY) dial is set to the missile code.		
	<i>e.</i> Set the CALIBRATE switch to TEST, the TEST SELECTOR switch to REC SENS, the ANT2-ANT4 switch to ANT2, and the PWR METER CAL switch to MEASURE.		
	<i>f.</i> Adjust the RESPONSE knob until the RESPONSE OR VOLTAGE meter indicates approximately 80.		
	<i>g.</i> Adjust the ATTEN-DB knob counterclockwise until the RESPONSE OR VOLTAGE meter indication averages 60.		

Table 4-11. Missile Electrical Checks — Continued

Step	Operation	Normal indication	Corrective procedure
22— Cont	<p><b>The ATTEN-DB dial indicates 11 or greater.</b></p> <p><i>h.</i> Set the ANT2-ANT4 switch to ANT4.</p> <p><b>A click is heard at the antenna-coupler test adapter.</b></p> <p><i>i.</i> Adjust the ATTEN-DB knob until the ATTEN-DB dial indicates 0.</p> <p><i>j.</i> Repeat <i>f</i>, <i>g</i>, and <i>i</i> above.</p> <p><b>The difference between the indications for ANT2 and ANT4 is less than 5 db.</b></p> <p><i>k.</i> Set the TEST SELECTOR NO. 1 switch to A.G.C.V.</p> <p><b>The NULL METER indicates within the white zone.</b></p> <p><i>l.</i> Turn the ATTEN-DB knob counterclockwise.</p> <p><b>The NULL METER indication increases (toward the right end of the meter scale.)</b></p> <p><i>m.</i> Adjust the ATTEN-DB knob until the ATTEN-DB dial indicates 0.</p>		
23.	<p>Perform the missile transmitter test.</p> <p><i>Note.</i> Turn the RESPONSE knob counterclockwise to prevent pegging of the RESPONSE OR VOLT-AGE meter when <i>a</i> below is performed.</p> <p><i>a.</i> Set the TEST SELECTOR switch to TRANS. TEST.</p> <p><i>b.</i> Set the RF POWER DB switch so that the RF POWER meter indicates as near to 0 as possible without being off scale.</p> <p><i>c.</i> Add the value of the RF POWER meter indication to the value of the RF POWER DB switch setting.</p> <p><b>The sum is equal to or less than 17 for missiles 13001 and subsequent.</b></p> <p><b>The sum is equal to or less than 20 for missiles 10206 through 11935.</b></p> <p><i>d.</i> Adjust the MEAS. FREQ knob for a dip to the left on the RF POWER meter. Adjust the MEAS. FREQ knob for the exact low point of the dip.</p> <p><i>Note.</i> Perform <i>e</i> below for missiles 10206 through 11935 or <i>f</i> for missiles 13001 and subsequent.</p> <p><i>e.</i> Determine the frequency from the calibration chart on the RF test set.</p> <p><b>The measured frequency is within 3 mc of the assigned missile frequency.</b></p> <p>Remove the plug from the MAG ADJ port (B, fig. 4-25) on the TCG. If the measured frequency is above tolerance, turn the MAG ADJ adjustment a few degrees clockwise. Repeat <i>d</i> and <i>e</i> above until the tolerance is met. Install the MAG ADJ port plug.</p> <p>If the measured frequency is below tolerance, turn the MAG ADJ adjustment a few degrees counterclockwise. Repeat <i>d</i> and <i>e</i> above until the tolerance is met. Install the MAG ADJ port plug.</p> <p><i>f.</i> Determine the frequency from the calibration chart on the missile RF test set group.</p> <p><b>The measured frequency is within 3 mc of the assigned missile frequency.</b></p> <p>Swing the forward body section to the right until the hinge lockpin snaps into the locked position, and remove the rear housing cover from the TCG.</p> <p>If the measured frequency is above tolerance, turn the magnetron adjustment nut a few degrees clockwise. Repeat <i>d</i> and <i>f</i> above until the tolerance is met. If the measured frequency is below tolerance, turn the magnetron adjustment nut a few degrees counterclockwise. Repeat <i>d</i> and <i>f</i> above until the tolerance is met.</p>		

Table 4-11. Missile Electrical Checks — Continued

Step	Operation	Normal indication	Corrective procedure
23— Cont			<p>Install the cover on the TCG. Swing the forward body section to the left until the hinge lockpin (12, fig. 3-29) snaps into the locked position. Secure the forward section to the testing fixture with the bolt (11, fig. 3-29) and washer (10).</p> <p><i>g.</i> Turn the MEAS FREQ knob fully counterclockwise.</p> <p><i>h.</i> Turn the RESPONSE knob until the RESPONSE OR VOLTAGE meter indicates approximately 80.</p> <p><i>i.</i> Set the TIME-MICROSECONDS switches in turn to all missile codes.</p> <p><b>The RESPONSE OR VOLTAGE meter deflects to the right only at the assigned code.</b></p> <p><i>j.</i> Set the TIME-MICROSECONDS switches to the assigned missile code +0.4 microseconds.</p> <p><b>The RESPONSE OR VOLTAGE meter indicates near 0.</b></p> <p><i>k.</i> Set the TIME-MICROSECONDS switches to the assigned missile code -0.5 microseconds.</p> <p><b>The RESPONSE OR VOLTAGE meter indicates near 0.</b></p> <p><i>l.</i> Set the TIME-MICROSECONDS switches to the assigned missile code.</p> <p>Measure the missile response time.</p> <p><i>Note.</i> Alinement of the D2 delay and response time A and of the microsecond oscillator is recommended if the missile response time is not within tolerance.</p> <p><i>a.</i> Set the TEST SELECTOR switch to COMM SIG RESP B.</p> <p><i>b.</i> and <i>c.</i> (Deleted)</p> <p><i>d.</i> Turn the RESPONSE knob until the RESPONSE OR VOLTAGE meter indicates approximately 80, or until the RESPONSE knob is fully clockwise.</p> <p><i>e.</i> Using the RESPONSE knob to keep the indication on scale, rotate the RESPONSE TIME MILLI-MICROSECONDS handwheel for a maximum indication on the RESPONSE OR VOLTAGE meter.</p> <p><i>f.</i> Adjust the RESPONSE knob until the RESPONSE OR VOLTAGE meter indicates 80 or until the RESPONSE knob is fully clockwise.</p> <p><i>g.</i> Rotate the RESPONSE TIME MILLI-MICROSECONDS handwheel clockwise until the RESPONSE OR VOLTAGE meter indicates a value 20 less than the value indicated in <i>f</i> above. Record the value indicated on the RESPONSE TIME MILLI-MICROSECONDS dial.</p> <p><i>h.</i> Rotate the RESPONSE TIME MILLI-MICROSECONDS handwheel counterclockwise until the RESPONSE OR VOLTAGE meter indicates maximum and then drops to a value 20 less than the value in <i>f</i> above. Record the value indicated on the RESPONSE TIME MILLI-MICROSECONDS dial.</p> <p><i>i.</i> Add the values recorded in <i>g</i> and <i>h</i> above. Divide the total value by two. This value is response time B in millimicroseconds.</p> <p><i>Note.</i> Response time B is in millimicroseconds and the fixed delay is in microseconds. To convert fixed delay to millimicroseconds, multiply by 1,000. Example: 0.87 microseconds is equal to 870 millimicroseconds. All values must be in millimicroseconds.</p> <p><i>j.</i> Add response time B to the fixed delay stamped on the front of the RF test set. Record the value.</p> <p><i>k.</i> Add response time A to 60 millimicroseconds (fixed waveguide delay). Record the value.</p>
24.			

Table 4-11. Missile Electrical Checks — Continued

Step	Operation	Normal indication	Corrective Procedure
24— Cont	l. Subtract the value determined in <i>k</i> above from the value determined in <i>j</i> above. This is the missile response time.		<p>The missile response time is 830 to 870 millimicroseconds.</p> <p>Perform alinement of D2 delay and response time A (table 4-10). Repeat steps <i>a</i> through <i>l</i> above. If missile response time is still not within tolerance, perform the procedures in para 12-21 (mushroom) or para 12-46 (stovepipe).</p>
25.	Adjust the dead time delay (missiles 13001 and subsequent).		<p><i>a.</i> Set the TEST SELECTOR switch to REC SENS.</p> <p><i>b.</i> Adjust the ATTEN-DB knob until the ATTEN-DB dial indicates 0.</p> <p><i>c.</i> Adjust the RESPONSE knob until the RESPONSE OR VOLTAGE meter indicates an average of 80.</p> <p><i>d.</i> Set the PITCH switch to -7G and the YAW switch to -7G.</p> <p><i>e.</i> Increase the indication of the MISSILE CODE (DELAY) dial until the RESPONSE OR VOLTAGE meter indication decreases to between 30 and 50.</p> <p>The MISSILE CODE (DELAY) dial indicates between missile code +2 and missile code +3.</p> <p>Remove the rear housing cover from the TCG. Position the MISSILE CODE (DELAY) dial to missile code +2.5.</p> <p>Adjust the delay time variable resistor R13 (fig. 4-30) on the pulse delay oscillator until the RESPONSE OR VOLTAGE meter indicates between 30 and 50.</p> <p>Install the rear housing cover on the TCG.</p> <p>Swing the forward body hinge to the left until the hinge lockpin (12, fig. 3-29) snaps into the locked position.</p> <p>Install the hexagon-head bolt (11, fig. 3-29) and the flat washer (10) to secure the left side of the forward body section to the testing fixture (5).</p>
26.	Test the fail-safe contacts.		<p><i>e. 1.</i> Set the PITCH and the YAW switches to 0G.</p> <p><i>f.</i> Position the MISSILE CODE (DELAY) dial to the missile code and adjust the RESPONSE knob until the RESPONSE OR VOLTAGE meter indicates an average of 80.</p> <p><i>a.</i> Set the PLATE POWER EXTERNAL switch to OFF.</p> <p>The PLATE POWER EXTERNAL indicator light extinguishes.</p> <p><i>b.</i> At the RF test set, set the TEST SELECTOR switch to FAIL-SAFE.</p> <p><i>c.</i> Set the CONTACT-NORMAL-TIME switch to CONTACT.</p> <p><i>d.</i> Set the FAIL-SAFE TEST—CONTACT switch to each position in sequence, starting with 1.</p> <p>The RESPONSE OR VOLTAGE meter indicates within the green area for each position of the FAIL-SAFE TEST—CONTACT switch.</p> <p><i>e.</i> Set the CONTACT-NORMAL-TIME switch to TIME.</p> <p><i>f.</i> Set the PLATE POWER EXTERNAL switch to ON.</p> <p>The PLATE POWER EXTERNAL indicator light illuminates.</p>
27.	Perform the fail-safe time check.		<p><i>a.</i> Set the FAIL-SAFE TEST—TIME switch to A+B.</p> <p>Note. Allow 10 seconds between operating the RESET and the START switches.</p>



Table 4-11. Missile Electrical Checks — Continued

Step	Operation	Normal indication	Corrective procedure
27— Cont	b. Operate the RESET switch. The counter tubes indicate at the reset position (between 0 and 1).		
	c. Operate the START switch. The counter tubes indicate between 1 and 5.		
	d. Set the FAIL-SAFE TEST—TIME switch to B+C.		
	e. Repeat b and c above.		
	f. Set the FAIL-SAFE TEST—TIME switch to A+C.		
	g. Repeat b and c above.		
	h. Set the FAIL-SAFE TEST—TIME switch to FAST 1.		
	i. Repeat b and c above.		
	j. Set the FAIL-SAFE TEST—TIME switch to FAST 2.		
	k. Repeat b and c above.		
	l. Set the CONTACT-NORMAL-TIME switch to NORMAL.		
	m. Repeat b and c above 10 times.		
28.	Measure the missile burst time.		
	a. At the RF test set, set the TEST SELECTOR switch to BURST.		
	b. Set the BURST TEST switch to NORMAL.		
	c. Operate the RESET switch. The counter tubes indicate at the reset position (between 0 and 1).		
	<i>Note.</i> Allow 10 seconds between operating the RESET and the START switches.		
	d. Operate the START switch. The counter tubes indicate between 16 and 26 milliseconds, and the RESPONSE OR VOLTAGE meter indicates near 0 (loss of missile response).		
	<i>Note.</i> "Loss of missile response" indication will not occur when ASP kits are installed in the missile.		
	Adjust R11 (burst timing) on the command detonation electric switch (A13). After R11 is adjusted, repeat steps c and d above.		
	e. Operate the RESET switch. The counter tubes indicate at the reset position (between 0 and 1).		
	<i>Note.</i> Omit step f below when ASP kits are installed in the missile.		
	f. Set the PLATE POWER EXTERNAL switch to OFF and then to ON. The RESPONSE OR VOLTAGE meter indicates to the right (missile response).		
	g. Repeat d through f above 9 times. The counter tubes indicate between 16 and 26 milliseconds for all readings.		
	h. Set the BURST TEST switch to B+EN.		
	i. Operate the START switch. The counter tubes indicate between 33 and 96 milliseconds, and the RESPONSE OR VOLTAGE meter indicates near 0 (loss of missile response).		
	<i>Note.</i> "Loss of missile response" indication will not occur when ASP kits are installed in the missile.		
	j. Operate the RESET switch. The counter tubes indicate at the reset position (between 0 and 1).		
	<i>Note.</i> Omit step k below when ASP kits are installed in the missile.		
	k. Set the PLATE POWER EXTERNAL switch to OFF and then to ON.		

Table 4-11. Missile Electrical Checks — Continued

Step	Operation	Normal indication	Corrective procedure
28— Cont	<p><b>The RESPONSE OR VOLTAGE meter indicates to the right (missile response).</b></p> <p><i>l.</i> Set the BURST TEST switch to B ONLY.</p> <p><i>m.</i> Operate the START switch.</p> <p><b>The counter tubes indicate a continuous count.</b></p> <p><i>n.</i> Operate the RESET switch.</p> <p><b>The counter tubes indicate at the reset position (between 0 and 1).</b></p> <p><i>o.</i> Set the BURST TEST switch to EN ONLY.</p> <p><i>p.</i> Operate the START switch.</p> <p><b>The counter tubes indicate a continuous count.</b></p> <p><i>q.</i> Operate the RESET switch.</p> <p><b>The counter tubes indicate at the reset position (between 0 and 1).</b></p> <p><i>r.</i> Set the BURST TEST switch to NORMAL.</p> <p><i>s.</i> Set the PLATE POWER EXTERNAL and the HEATERS EXTERNAL switches to OFF.</p> <p><i>t.</i> Disconnect the fail-safe harness connector P511 from JUMPER connector J2.</p> <p><i>Note.</i> Perform <i>u</i> and <i>v</i> below for missiles 13001 and subsequent.</p> <p><i>u.</i> Remove the bolts, flat washers, and the sequential timer from the fail-safe and timer bracket.</p> <p><i>v.</i> Position the sequential timer with JUMPER connector J2 forward, in the fail-safe and timer bracket and secure with the bolts and flat washers.</p> <p><i>w.</i> Remove the electrical wire and tag from TIMER connector J1. Retain the wire and tag for later use.</p> <p><i>x.</i> Remove the protective dust cap from TIMER connector J1, and install on JUMPER connector J2.</p> <p><i>y.</i> Connect the fail-safe harness connector P511 to TIMER connector J1.</p> <p><i>z.</i> Set the HEATERS EXTERNAL switch to ON.</p> <p><i>aa.</i> Set the PLATE POWER EXTERNAL switch to ON.</p> <p><b>After approximately 30 seconds, the PLATE POWER EXTERNAL indicator light illuminates.</b></p> <p><i>ab.</i> Operate the START switch.</p> <p><b>The counter tubes indicate between 341 and 361 milliseconds and the RESPONSE OR VOLTAGE meter indicates near 0 (loss of missile response).</b></p> <p><i>Note.</i> "Loss of missile response" indication will not occur when ASP kits are installed in the missile.</p> <p><i>ac.</i> Operate the RESET switch.</p> <p><b>The counter tubes indicate at the reset position (between 0 and 1).</b></p> <p><i>Note.</i> Omit step <i>ad</i> below when ASP kits are installed in the missile.</p> <p><i>ad.</i> Set the PLATE POWER EXTERNAL switch to OFF and then to ON.</p> <p><b>The RESPONSE OR VOLTAGE meter indicates to the right (missile response).</b></p> <p><i>Note.</i> Allow 10 seconds between each repetition in <i>ae</i> below.</p> <p><i>ae.</i> Repeat <i>ab</i> through <i>ad</i> above 9 times.</p> <p><b>All counter tube indications must be between 341 and 361 milliseconds.</b></p>		



Table 4-11. Missile Electrical Checks—Continued

Step	Operation	Normal indication	Corrective procedure
29	<p>Check the operation of the roll servo system (static).</p> <p><i>Note.</i> Perform <i>a</i> below for missiles 10206 through 11395.</p> <p><i>a.</i> Depress the PUSH TO RESET switch (16, fig. 4-20) on safety-and-arming switch S30 (6), and check that the green field is visible through the inspection window (11).</p> <p><i>b.</i> Set the switch to the positions listed in (1) through (6) below.</p> <p>(1) PITCH switch to OG.</p> <p>(2) YAW switch to OG.</p> <p>(3) TEST SELECTOR switch to COMM SIG RESP B.</p> <p>(4) PRESET-FLIGHT switch to PRESET.</p> <p>(5) TEST SELECTOR NO. 1 switch to GYRO PRESET.</p> <p>(6) ROLL POSITION switch to NORMAL.</p> <p><i>c.</i> Depress the ROLL pushbutton.</p> <p><i>d.</i> Operate the GYRO PRESET switch to CW.</p> <p style="padding-left: 40px;">The NULL METER indicates 1, 2, 3, and 4 in sequence.</p> <p><i>e.</i> Operate the GYRO switch to CCW.</p> <p style="padding-left: 40px;">The NULL METER indicates 1, 2, 3, and 4 in sequence.</p> <p><i>f.</i> Set the PRESET-FLIGHT switch to FLIGHT.</p> <p><i>g.</i> Operate the GYRO PRESET switch to CW.</p> <p style="padding-left: 40px;">The NULL METER deflects equally and smoothly on both sides of 1.</p> <p><i>h.</i> Operate the GYRO PRESET switch to CCW.</p> <p style="padding-left: 40px;">The NULL METER deflects equally and smoothly on both sides of 1.</p> <p><i>i.</i> Operate the GYRO PRESET switch to CW or CCW until the NULL METER indicates 1.</p> <p><i>j.</i> Set the PRESET-FLIGHT switch to PRESET.</p> <p style="padding-left: 40px;">The NULL METER indicates 1.</p> <p style="padding-left: 80px;">Operate the GYRO PRESET switch to CW or CCW until the NULL METER indicates 1, and repeat <i>f</i>, <i>i</i>, and <i>j</i> above.</p> <p><i>k.</i> Set the PRESET-FLIGHT switch to FLIGHT.</p> <p><i>l.</i> Operate the GYRO PRESET switch to CW or CCW until the NULL METER indicates one-eighth of an inch to the left side of 1.</p> <p><i>Note.</i> Perform <i>m</i> through <i>p</i> below for missiles with an APS.</p> <p><i>m.</i> Set the PLATE POWER EXTERNAL and HEATERS EXTERNAL switches to OFF.</p> <p style="padding-left: 40px;">The PLATE POWER EXTERNAL and HEATER EXTERNAL indicator lights extinguish.</p> <p><i>n.</i> Perform the arm safety check (par. 4-6).</p> <p><i>o.</i> Set the AC POWER switch on the TPCU to ON.</p> <p style="padding-left: 40px;">The POWER ON indicator light illuminates.</p> <p><i>p.</i> Set the HEATERS EXTERNAL and PLATE POWER EXTERNAL switches to ON.</p> <p style="padding-left: 40px;">The HEATERS EXTERNAL indicator light illuminates. After approximately 30 seconds, the PLATE POWER EXTERNAL indicator light illuminates.</p>		

Table 4-11. Missile Electrical Checks—Continued

Step	Operation	Normal indication	Corrective procedure
29	q. Set the TEST SELECTOR NO. 1 switch to RATE.		
Cont		The NULL METER indicates within the white zone.	
	r. (Deleted)		
	<i>Note.</i> Perform <i>s</i> and <i>t</i> below for missiles with an APS or <i>u</i> through <i>x</i> below for missiles with an HPU.		
	s. Operate the AUXILIARY POWER SUPPLY switch to START, and hold for a minimum of 1 second and a maximum of 2 seconds.		
	<b>WARNING:</b> Insure that all personnel stay clear of the area surrounding the missile elevons while applying hydraulic pressure.		
	<b>CAUTION:</b> APS running time with the external drive motor is 20 minutes ON, 30 minutes OFF.		
	t. Set the external drive motor switch (fig. 4-9) to ON.		
		The external drive motor accelerates to operating speed as indicated by a change in pitch of the external drive motor sound. The ACC. AIR PRESS. gage (fig. 4-7) indicates 2,500 to 3,000 psi.	
	t.1. Set the ROLL POSITION switch to NORMAL and the TEST SELECTOR NO. 1 switch to GYRO PRESET.		
	t.2. Operate the GYRO PRESET switch back-and-forth until the NULL METER indicates 1 (approximately 1 minute) in both positions of the PRESET FLIGHT switch.		
	t.3. Set the PRESET-FLIGHT switch to FLIGHT and operate the GYRO PRESET switch back-and-forth until the NULL METER indicates one-eighth of an inch to the left of 1.		
	t.4. Set the ROLL POSITION switch to GROUND.		
		There is no elevon oscillation.	
	<i>Note.</i> Perform <i>u</i> below for a permanent-type installation or <i>v</i> below for a mobile-type installation.		
	u. Set the ELECTRICAL HPU POWER circuit breaker on the power conversion unit (fig. 4-14) to ON.		
		The ELECTRICAL HPU POWER indicator light illuminates.	
	v. Set circuit breaker CB2 on the distribution box in the test station truck to ON.		
	<b>CAUTION:</b> Do not depress PUSH TO READ DC CURRENT pushbutton when depressing ELECTRICAL HPU START pushbutton on the power conversion unit or the distribution box in the test station truck.		
	w. Depress the ELECTRICAL HPU START pushbutton.		
		The accumulator air pressure gage (fig. 4-18) indicates 2,700 to 3,200 psi.	
	x. Depress the PUSH TO READ DC CURRENT pushbutton.		
		The DC CURRENT meter does not exceed 120 amperes.	
		The DC VOLTAGE meter indicates 27.9 to 35.6 volts.	
	x.1. Set the ROLL POSITION switch to NORMAL and the TEST SELECTOR NO. 1 switch to GYRO PRESET.		
	x.2. Operate the GYRO PRESET switch back-and-forth until the NULL METER indicates 1 (approximately 1 minute) in both positions of the PRESET FLIGHT switch.		

Table 4-11. Missile Electrical Checks—Continued

Step	Operation	Normal indication	Corrective procedure
29 Cont	<p>x.3. Set the PRESET-FLIGHT switch to FLIGHT and operate the GYRO PRESET switch back-and-forth until the NULL METER indicates one-eighth of an inch to the left of 1.</p> <p>x.4. Set the ROLL POSITION switch to GROUND.</p> <p>There is no elevon oscillation.</p> <p>y. Set the TEST SELECTOR NO. 1 switch to BUZZ V., and depress the ROLL pushbutton.</p> <p>The NULL METER indicates as shown in table 4-12.</p> <p>Adjust the R-BUZZ variable resistor (D, fig. 4-25 or A, fig. 4-26) in the transponder control group.</p> <p>z. Depress the YAW pushbutton.</p> <p>The NULL METER should indicate as shown in table 4-12.</p> <p>Adjust the Y-BUZZ variable resistor (D, fig. 4-25 or A, fig. 4-26) in the transponder-control group.</p> <p>aa. Depress the PITCH pushbutton.</p> <p>The NULL METER should indicate as shown in table 4-12.</p> <p>Adjust the P-BUZZ variable resistor (A, fig. 4-25 or A, fig. 4-26) in the transponder-control group.</p> <p>ab. Operate the YAW switch to +7G, then to OG.</p> <p>ac. Operate the PITCH switch to +7G, then to OG.</p> <p>ad. Depress the ROLL pushbutton, and set the TEST SELECTOR NO. 1 switch to FIN.</p> <p>The NULL METER indicates 1.</p> <p>Adjust the R-BAL variable resistor (D, fig. 4-25) or R-CENT variable resistor R33 (A, fig. 4-26) in the transponder control group until the NULL METER indicates 1.</p> <p>ae. Check the buzz voltage in accordance with y through aa above.</p> <p>af. Repeat ad and ae above until no further adjustment is necessary.</p> <p>Note. Perform ag below for missiles 10206 through 11935.</p> <p>ag. Install the air filter on the R-BUZZ-BAL adjustment port.</p> <p>ah. Set the ROLL POSITION switch to NORMAL.</p> <p>Check the operation of the yaw servo system.</p> <p>WARNING: Insure that the left side of the forward body section (8, fig. 3-29) is secure to the testing fixture (5) with the hexagon-head bolt (11) and flat washer (10) prior to performing a below.</p> <p>a. Rotate the mated forward and rear body sections so that the forward body section is in the test position. Forward fin assembly 1 (A, fig. 4-28) is at the 12 o'clock position.</p> <p>b. Set the TEST SELECTOR NO. 1 switch to ACC.</p>		

30



Table 4-11. Missile Electrical Checks — Continued

Step	Operation	Normal indication	Corrective procedure
30— Cont	c. Depress the PITCH pushbutton.	<b>The NULL METER indicates hard over to the left.</b>	
	d. Depress the YAW pushbutton.	<b>The NULL METER indicates within the white zone.</b>	
	e. Set the TEST SELECTOR NO. 1 switch to RATE.	<b>The NULL METER indicates within the white zone.</b>	
	f. Move the forward body section sharply to the right and simultaneously observe the NULL METER.	<b>The NULL METER deflects to the left as the forward body section is moved.</b>	
	g. Operate the YAW switch to +7G, then to 0G.		
	g.1. Set the ROLL POSITION switch to GROUND.		
	h. Set the TEST SELECTOR NO. 1 switch to FIN.	<b>The NULL METER indicates 1.</b>	Adjust the Y-BAL variable resistor (D, fig. 4-25) or the Y-CENT variable resistor R7 (A, fig. 4-26) in the TCG until the NULL METER indicates 1.
	i. Set the TEST SELECTOR NO. 1 switch to BUZZ V.	<b>The NULL METER indicates as shown in table 4-12.</b>	Adjust the Y-BUZZ variable resistor as necessary.
	j. Repeat h and i above until no further adjustments are necessary.		
	<i>Note.</i> Perform k below for missiles 10206 through 11935.		
	k. Install the air filter on the Y-BUZZ-BAL adjustment port.		
	l. Set the ROLL POSITION switch to NORMAL.		
	m. Set the TEST SELECTOR NO. 1 switch to GYRO PRESET, and depress the ROLL pushbutton. Set the roll amount gyro to its control point (steps 29j and k above).		
	n. Check that the Y elevons are between the two outer scribe lines, and set the TEST SELECTOR NO. 1 switch to OFF.		
	o. Set the YAW switch to +7G.	<b>The trailing edge of the Y elevon (A, fig. 4-29) deflects to the right.</b>	
	p. Set the YAW switch to 0G.	<b>The elevons return to a position between the two outer scribe lines.</b>	
	q. Set the YAW switch to -7G.	<b>The trailing edge of the Y elevons (B, fig. 4-29) deflects to the left.</b>	
	r. Set the YAW switch to 0G.	<b>The Y elevons return to a position between the two outer scribe lines.</b>	
	s. Set the YAW switch to FINS.		
	t. Slowly turn the FINS knob fully clockwise and fully counterclockwise several times.	<b>The Y elevons deflect smoothly.</b>	
	u. Set the YAW switch to 0G.		
31.	Check the operation of the roll servo system (dynamic) and the flipover circuits.		
	a. Operate the GYRO switch to UNCAGE.	<b>The GYRO UNCAGE indicator light illuminates.</b>	
	b. Set the TEST SELECTOR NO. 1 switch to ROLL 0°.		
	c. Depress the ROLL pushbutton.	<b>The NULL METER indicates within the white zone.</b>	
	d. Set the TEST SELECTOR NO. 1 switch to RATE.	<b>The NULL METER indicates within the white zone.</b>	
	e. Set the power switch on the cooling unit to OFF.		



Table 4-11. Missile Electrical Checks — Continued

Step	Operation	Normal indication	Corrective procedure
31— Cont	<p>f. Disconnect the cooling unit air hose assembly from the hose coupling adapter (2, fig. 4-3) or hose assembly (5).</p> <p><b>Caution:</b> Observe the guidance package operating cycles in accordance with tables 4-7, 4-8, and 4-9.</p> <p><b>Warning:</b> Insure that the left side of the forward body section (8, fig. 3-29) is secured to the testing fixture (5) with the hexagon-head bolt (11) and flat washer (10) prior to performing <i>g</i> below.</p> <p>g. Roll the missile clockwise, and simultaneously observe the NULL METER.  <b>The NULL METER deflects to the right as the missile is rolled.</b></p> <p>h. Continue rolling the missile to the 90° clockwise position.  <b>The elevons deflect to produce counterclockwise roll (C, fig. 4-29).</b></p> <p>i. Set the TEST SELECTOR NO. 1 switch to FIN.  <b>The NULL METER indicates hard over to the left.</b></p> <p>j. Set the TEST SELECTOR NO. 1 switch to ROLL 90° CW. Depress and release the RESET switch.  <b>The NULL METER indicates within the white zone.</b></p> <p>k. Set the TEST SELECTOR switch to BURST.</p> <p>l. Operate the RESET switch on the RF test set.</p> <p>m. Operate the START switch.  <b>The elevons deflect in the opposite direction and the RESPONSE OR VOLTAGE meter indicates near 0.</b></p> <p>n. Set the TEST SELECTOR switch to COMM SIG RESP B.</p> <p>o. Set the PLATE POWER EXTERNAL switch to OFF and then to ON.  <b>The RESPONSE OR VOLTAGE meter indicates to the right (missile response).</b></p> <p>p. Set the GYRO switch to CAGE.  <b>The GYRO UNCAGE indicator light extinguishes.</b></p> <p>q. Set the TEST SELECTOR NO. 1 switch to GYRO PRESET.</p> <p>r. Set the roll amount gyro to its control point (step 29j and <i>k</i> above).</p> <p>s. Operate the GYRO PRESET switch to CW or CCW until the NULL METER indicates one-eighth of an inch to the left side of 1.</p>		
32.	<p>Check the operation of the pitch servo system.</p> <p>a. Set the TEST SELECTOR NO. 1 switch to ACC., and depress the YAW pushbutton.  <b>The NULL METER indicates hard over to the right.</b></p> <p>b. Depress the PITCH pushbutton.  <b>The NULL METER indicates within the white zone.</b></p> <p>c. Set the TEST SELECTOR NO. 1 switch to RATE.  <b>The NULL METER indicates within the white zone.</b></p> <p>d. Move the forward body section sharply to the right and simultaneously observe the NULL METER.  <b>The NULL METER deflects to the left as the forward body section is moved.</b></p> <p>e. Operate the PITCH switch to +7G, then to 0G.</p> <p>f. Set the ROLL POSITION switch to GROUND.</p> <p>g. Set the TEST SELECTOR NO. 1 switch to FIN.  <b>The NULL METER indicates 1.</b></p>		

Table 4-11. Missile Electrical Checks — Continued

Step	Operation	Normal indication	Corrective procedure
32— Cont			<p>Adjust the P-BAL variable resistor (A, fig. 4-25) or the P-CENT variable resistor R19 (A, fig. 4-26) in the TCG until the NULL METER indicates 1.</p> <p><i>h.</i> Set the TEST SELECTOR NO. 1 switch to BUZZ-V.  <b>The NULL METER indicates as shown in table 4-12.</b>  Adjust the P-BUZZ variable resistor as necessary.</p> <p><i>i.</i> Repeat <i>g</i> and <i>h</i> above until no further adjustments are necessary.  <i>Note.</i> Perform <i>j</i> below for missiles 10206 through 11935.</p> <p><i>j.</i> Install the air filter on the P-BUZZ-BAL adjustment port.</p> <p><i>k.</i> Set the ROLL POSITION switch to NORMAL.</p> <p><i>l.</i> Depress the ROLL pushbutton.</p> <p><i>m.</i> Set the TEST SELECTOR NO. 1 switch to GYRO PRESET. Set the roll amount gyro to its control point (steps 29<i>j</i> through <i>k</i> above).</p>



Table 4-11. Missile Electrical Checks—Continued

Step	Operation	Normal indication	Corrective procedure
32 Cont	n. Check that the P elevons are between the two outer scribe lines, and set the TEST SELECTOR NO. 1 switch to OFF.		
	o. Set the PITCH switch to +7G.	The trailing edge of the P elevons (D, fig. 4-29) deflects to the right.	
	p. Set the PITCH switch to 0G.	The P elevons return to a position between the two outer scribe lines.	
	q. Set the PITCH switch to -7G.	The trailing edge of the P elevons (E, fig. 4-29) deflects to the left.	
	r. Set the PITCH switch to 0G.	The P elevons return to a position between the two outer scribe lines.	
	s. Set the PITCH switch to FINS.		
	t. Slowly turn the FINS knob fully clockwise and fully counterclockwise several times.	The P elevons deflect smoothly.	
	u. Set the PITCH switch to 0G.		
33	Check the pressure transmitter.		
	<b>WARNING:</b> Insure that the left side of the forward body section (8, fig. 3-29) is secured to the testing fixture (5) with the hexagon-head bolt (11) and flat washer (10) prior to performing <i>a</i> below.		
	a. Rotate the mated forward and rear body sections so that the forward body section is in the flight position (B, fig. 4-26).		
	b. Connect the cooling unit air hose assembly (1, fig. 4-3) to the hose coupling adapter (2) or the hose assembly (5).		
	c. Set the POWER switch (10) on the cooling unit to ON.		
	<b>WARNING:</b> Insure that the self-locking pins (view A, fig. 9-1) are inserted through the handling ring segment.		
	d. Connect the hose assembly (5, fig. 4-24) to the adapter hose assembly (1) on the ram-pressure probe (2) and to the LINE fitting (9) on top of the stagnation pressure pump (8).		
	e. Remove the cap from the VENT fitting (10) on the top of the stagnation pressure pump.		
	f. Set the VAC-OFF-PRESS knob (6) on top of the stagnation pressure pump to PRESS.		
	g. Operate the handle (7) to apply pressure until the gage indicates 50 to 60 on the PRESS scale.		
		All elevons deflect toward the center scribe lines.	
	h. Remove a plug from a plug hose assembly (4).	The indication on the gage decreases to 0.	
		All elevons deflect smoothly and continuously away from the center scribe lines.	
	<i>Note.</i> Remove a plug from a different plug hose assembly for each check.		

Table 4-11. Missile Electrical Checks—Continued

Step	Operation	Normal indication	Corrective procedure
33	i. Install the plug on the plug hose assembly.		
Cont	j. Set the VAC-OFF-PRESS knob on the stagnation pressure pump to VAC.		
	k. Operate the handle to apply a vacuum until the gage indicates 8 to 12 on the VAC scale.		
		All elevons deflect away from the center scribe lines.	
	l. Remove a plug from a plug hose assembly.		
		The indication on the gage decreases to 0.	
		All elevons deflect smoothly and continuously toward the center scribe lines.	
	m. Install the plug on the plug hose assembly.		
	n. Set the VAC-OFF-PRESS knob on the stagnation pressure pump to PRESS.		
	Note. Perform o below for missiles with an APS or p below for missiles with an HPU.		
	o. Set the external drive motor switch to OFF.		
	p. Depress the ELECTRICAL HPU STOP pushbutton.		
	q. Set the PITCH and YAW switches to FINS, and rotate the FINS knob until the hydraulic pressure is too low to obtain elevon response.		
	r. Manually position all elevons between the two outer scribe lines and hold them.		
	s. Set the PITCH and YAW switches to OG.		
	t. Depress the ROLL pushbutton.		
	u. Operate the D.C. VOLTS switch to the up position and hold while performing v through y below.		
	v. Operate the GYRO PRESET switch to CW or CCW until the NULL METER indicates near the small white mark on the right of the dial.		
	w. Operate the handle to apply pressure until the gage indicates 50 to 60 on the PRESS scale.		
		The NULL METER indication decreases.	
	x. Set the VAC-OFF-PRESS knob on the stagnation pressure pump to VAC.		
	y. Operate the handle to apply a vacuum of 8 to 12 on the VAC scale.		
		The NULL METER indication increases.	
	z. Release the elevons and DC VALVE VOLTS switch.		
	aa. Set the VAC-OFF-PRESS knob on the stagnation pressure pump to PRESS.		
	ab. Operate the handle to apply pressure until the gage indicates 50 to 60 on the PRESS scale.		
	ac. Set the VAC-OFF-PRESS knob to OFF, retaining in excess of 30 psi on the PRESS scale.		
	ad. After 1 minute, check the pressure. The pressure loss does not exceed 10 percent.		
	ae. Remove the plug from the plug hose assembly.		
		The pressure decreases to 0.	
	af. Disconnect the hose assembly from the adapter hose assembly and the stagnation pressure pump.		
	ag. Set the TEST SELECTOR NO. 1 switch to GYRO PRESET.		
	ah. Set the roll amount gyro to its control point (steps 29j and k).		
	ai. Release the ROLL pushbutton.		
34	Perform the precise command check.		
	Note. Perform a through d below for missiles with an APS.		
	a. Set the PLATE POWER EXTERNAL and HEATERS EXTERNAL switches to OFF.		
		The PLATE POWER EXTERNAL and HEATERS EXTERNAL indicator lights extinguish.	

Table 4-11. Missile Electrical Checks—Continued

Step	Operation	Normal indication	Corrective procedure
34 Cont	<p>b. Perform the arm safety check (par. 4-6).</p> <p>c. Set the AC POWER, HEATERS EXTERNAL, and PLATE POWER EXTERNAL switches on the TPCU to ON.</p> <p>The POWER ON and HEATERS EXTERNAL indicator lights illuminate. After approximately 30 seconds, PLATE POWER EXTERNAL indicator light illuminates.</p> <p>d. Set the external drive motor switch to ON.</p> <p>The external drive motor accelerates to operating speed as indicated by the change in pitch of the external drive motor sound.</p> <p>The ACC. AIR PRESS. gage indicates 2,500 to 3,000 psi.</p> <p><i>Note.</i> Perform e through o below for missiles with an HPU.</p> <p><i>Note.</i> Make certain that connector P544 is disconnected from connector J544 on the HPU squib battery, and that the shorting dummy connector (with pin C shorted to pin E) is installed on connector J544.</p> <p>e. Set the GLOW COIL switch on the TPCU to ON.</p> <p>f. Depress the APS ACCEL indicator light on the TCU.</p> <p>The APS ACCEL indicator light illuminates.</p> <p>g. Depress the RESET pushbutton on the TCU.</p> <p>h. Operate the AUXILIARY POWER SUPPLY switch to START, and hold for approximately 1 second and a maximum of 2 seconds.</p> <p>The APS ACCEL indicator light does not illuminate.</p> <p>i. Depress RESET pushbutton on the TCU.</p> <p>CAUTION: Do not depress the PUSH TO READ DC CURRENT pushbutton when depressing the ELECTRICAL HPU START pushbutton.</p> <p>j. Depress the ELECTRICAL HPU START pushbutton.</p> <p>The accumulator air pressure gage indicates 2,700 to 3,200 psi.</p> <p>k. Depress the RESET pushbutton on the TCU.</p> <p>l. Depress the PUSH TO READ DC CURRENT pushbutton.</p> <p>The DC CURRENT meter does not exceed 120 amperes.</p> <p>The DC VOLTAGE meter indicates 27.9 to 35.6 volts.</p> <p>m. Operate the AUXILIARY POWER SUPPLY switch to START, and hold for a minimum of 1 second and a maximum of 2 seconds.</p> <p>The APS ACCEL indicator light illuminates.</p> <p>n. Set the GLOW COIL switch to OFF.</p> <p>o. Depress the RESET pushbutton on the TCU.</p> <p>The APS ACCEL indicator light extinguishes.</p> <p>p. Set the TEST SELECTOR switch to COMM SIG RESP B.</p> <p>q. Set the YAW switch to +7G.</p> <p>r. Set the TEST SELECTOR NO. 1 switch to TRANS. NO. 2.</p> <p>s. Set the TEST SELECTOR NO. 2 switch to +G.</p> <p>t. Depress the YAW pushbutton.</p> <p>The NULL METER indicates within the white zone.</p> <p>u. Set the YAW switch to -7G.</p> <p>v. Set the TEST SELECTOR NO. 2 switch to -G.</p> <p>The NULL METER indicates within the white zone.</p> <p>w. Set the YAW switch to 0G.</p>		

Table 4-11. Missile Electrical Checks—Continued

Step	Operation	Normal indication	Corrective procedure
34 Cont	<p>x. Set the PITCH switch to +7G.</p> <p>x.J. Set the TEST SELECTOR NO. 2 switch to +G.</p> <p>y. Depress the PITCH pushbutton.</p> <p>The NULL METER indicates within the white zone.</p> <p>aa. Set the PITCH switch to -7G.</p> <p>ab. Set the TEST SELECTOR NO. 2 switch to -G.</p> <p>The NULL METER indicates within the white zone.</p> <p>ac. Set the PITCH switch to 0G.</p> <p>ad. Release the PITCH pushbutton.</p> <p>ae. Set the TEST SELECTOR NO. 2 switch to TRANS. NO. 1.</p> <p>af. Set the SELECTOR NO. 1 switch to OFF.</p>		
35	<p>Perform the internal operation check.</p> <p><i>Note.</i> When operating the MISSILE POWER switch to INT, hold for approximately 2 seconds.</p> <p><i>Note.</i> The RESPONSE OR VOLTAGE meter indication may change momentarily and return to approximately the original reading. If the indication does not return to approximately the original reading, perform troubleshooting procedures.</p> <p>a. Operate the MISSILE POWER switch to INT.</p> <p>The MISSILE POWER INTERNAL indicator light illuminates. The HEATERS EXTERNAL and PLATE POWER EXTERNAL indicator lights extinguish. The elevons drift hard over (missiles 10206 through 11935 with transponder control group 9006596 or 9006599 and missiles 13001 and subsequent).</p> <p><i>Note.</i> Perform b through d for missiles 10206 through 11395.</p> <p>b. Set the TEST SELECTOR NO. 1 switch to MISSILE V.</p> <p>The NULL METER indicates within the white zone.</p> <p>c. Set the TEST SELECTOR NO. 1 switch to MISSILE I.</p> <p>The NULL METER indicates within the white zone.</p> <p>d. Set the TEST SELECTOR NO. 1 switch to BAT. V.</p> <p>The NULL METER indicates within the white zone.</p> <p><b>CAUTION:</b> Do not operate the MISSILE POWER switch to EXT with INERTIA switches S1 and S2 in the armed position (C, fig. 4-25 or A, fig. 4-26).</p> <p>e. Operate the MISSILE POWER switch to EXT.</p> <p>The MISSILE POWER INTERNAL indicator light extinguishes. The HEATERS EXTERNAL and PLATE POWER EXTERNAL indicator lights illuminate. The elevons return to the original position (missile 10206 through 11935 with transponder control group 9006596 or 9006599 and missiles 13001 and subsequent).</p> <p><i>Note.</i> Perform f through j below for missiles 10206 through 11935 or k and l below for missiles 13001 and subsequent.</p> <p>f. Remove the air filter from the INERTIA SWITCH adjustment port.</p> <p>g. Insert a stubby screwdriver through the INERTIA SWITCH adjustment port (C, fig. 4-25) on the transponder control group and move the switch arm to the rear (armed) position.</p> <p>The MISSILE POWER INTERNAL and GYRO UNCAGE indicator lights illuminate.</p> <p>The HEATERS EXTERNAL and PLATE POWER EXTERNAL indicator lights extinguish.</p>		

Table 4-11. Missile Electrical Checks—Continued

Step	Operation	Normal indication	Corrective procedure
35 Cont		The RESPONSE OR VOLTAGE meter indication does not change. The elevons drift hard over on missiles with transponder-control group 9006596 or 9006599.	
	h. Set the TEST SELECTOR NO. 1 switch to OFF.		
	i. Insert a stubby screw driver through the INERTIA SWITCH adjustment port on the transponder control group, and move the switch to the forward (safe) position.	The MISSILE POWER INTERNAL indicator light dims. If the MISSILE POWER INTERNAL indicator light does not dim repeat <i>i</i> .	
	j. Install the air filter on the INERTIA SWITCH adjustment port.		
	Note. The MISSILE POWER INTERNAL indicator light illuminates and dims appreciably 1 to 2 seconds later and remains dim through <i>m</i> below, indicating normal operation of the K-512 timer (missile 13684 and subsequent)		
	k. Arm INERTIA switches S1 and S2 (B, fig. 4-26) in the transponder control group by pushing the weights to the rear position.	The MISSILE POWER INTERNAL and GYRO UNCAGE indicator lights illuminate. The HEATERS EXTERNAL and PLATE POWER EXTERNAL indicator lights extinguish. The RESPONSE OR VOLTAGE meter indication may change momentarily and return to approximately original reading. The elevons drift hard over.	Perform troubleshooting procedures.
	Note. The Missile POWER INTERNAL indicator light illuminates and dims appreciably 1 to 2 seconds later, indicating normal operation of the K-512 timer (missiles 13684 and subsequent).		
	Note. The MISSILE POWER INTERNAL indicator light remains dim (missiles 70634 and subsequent).		
	l. Dearm INERTIA switches S1 and S2 in the transponder control group by pushing the weights forward.	The MISSILE POWER INTERNAL indicator light dims. If the MISSILE POWER INTERNAL indicator light does not dim, repeat <i>k</i> and <i>l</i> .	
	m. Operate the GYRO switch to CAGE.	The GYRO UNCAGE indicator light extinguishes. If the GYRO UNCAGE indicator light does not extinguish, repeat <i>i</i> or <i>l</i> above.	
	n. Operate the MISSILE POWER INTERNAL switch to EXT.	The MISSILE POWER INTERNAL indicator light extinguishes. The HEATERS EXTERNAL and PLATE POWER EXTERNAL indicator lights illuminate. The elevons return to the original position (missiles 10206 through 11935 with transponder control group 9006596 or 9006599 and missiles 13001 and subsequent).	
	Note. Perform <i>o</i> below for missiles with an APS or <i>p</i> through <i>r</i> below for missiles with an HPU.		
	o. Set the external drive motor switch to OFF.		
	p. Depress the ELECTRICAL HPU STOP pushbutton.		
	Note. Perform <i>q</i> below for a permanent-type installation or <i>r</i> below mobile-type installation.		



Table 4-11. Missile Electrical Checks—Continued

Step	Operation	Normal indication	Corrective procedure
35 Cont	<p>q. Set the ELECTRICAL HPU POWER circuit breaker on the power conversion unit to OFF.</p> <p><b>The ELECTRICAL HPU POWER indicator light extinguishes.</b></p> <p>r. Set circuit breaker CB2 on the distribution box in the mobile test unit to OFF.</p> <p>s. Bleed the pressure from the elevons.</p> <p>t. Set the TEST SELECTOR switch to TRANS. TEST.</p> <p>u. Check the magnetron frequency (step 23b through g).</p> <p><b>The measured frequency is within 3 mc of the assigned frequency.</b></p> <p>If the measured frequency is within 10 mc of the assigned frequency, adjust the magnetron to within 3 mc of the assigned frequency. If the measured frequency is more than 10 mc from the assigned frequency, replace magnetron tubes (par 12-12 Mushroom or par. 12-38 Stovepipe).</p> <p>v. Set the PLATE POWER EXTERNAL switch to OFF.</p> <p><b>The PLATE POWER EXTERNAL indicator light extinguishes.</b></p> <p>w. Set the HEATERS EXTERNAL switch to OFF.</p> <p><b>The HEATERS EXTERNAL indicator light extinguishes.</b></p> <p>x. Set the POWER switch on the cooling unit to OFF.</p> <p><i>Note.</i> Perform y through aa below for missiles 13001 and subsequent.</p> <p>y. Clean the seal and surfaces of the access cover plate (5, fig. 12-2) and the transponder control group (1) with toluene 6810-281-2002.</p> <p>z. Lubricate the seal surfaces with insulating compound, MIL-S-8660.</p> <p>aa. Install the six captive screws (3) to secure the access cover plate to the transponder control group.</p> <p><i>Note.</i> Perform ab below for missiles 10206 through 11935.</p> <p>ab. Remove the air filters, install all screw-type plugs (5, 8, 11, 12, 15, and 18, fig.4-1) in the transponder control group.</p> <p><i>Note.</i> When the HPU has been deenergized after several minutes of operation, the HPU hydraulic level indicator may indicate in the BLEED area because of the rise in oil temperature. The indicator will move to the FULL area when the oil returns to ambient temperature.</p>		

Table 4-12. Hydraulic Oil Change and Buzz Voltage Requirements

Missile hydraulic configuration	Expected average temperature for the coming month	Hydraulic oil <sup>a</sup>	Buzz voltage indication on the NULL METER on the TCU.
APS without winterization kit	160°F to 50°F	MIL-H-5606	Within white zone (100-128%)
	70° to -40°F <sup>a</sup>	MIL-H-5606 <sup>a</sup>	Right black zone (128-150%)

Table 4-12. Hydraulic Oil Change and Buzz Voltage Requirements—Continued

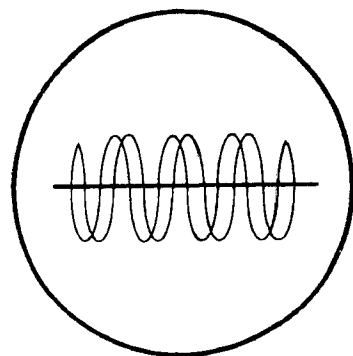
<i>Missile hydraulic configuration</i>	<i>Expected average temperature for the coming month</i>	<i>Hydraulic oil<sup>1</sup></i>	<i>Buzz voltage indication on the NULL METER on the TCU.</i>
HPU or APS with winterization kit	160°F to 50°F	MIL-H-5606	Within white zone (100-128%)
	70°F to -40°F <sup>1</sup>	MIL-H-5606 <sup>1</sup>	Right black zone (128-150%)
	95°F to 35°F	MIS-10137 <sup>2</sup>	Within white zone (100-128%)
	55°F to -10°F	MIS-10137 <sup>2</sup>	Right black zone (128-150%)
	30°F to -40°F	MPD-2067	Right black zone (128-150%)

<sup>1</sup> The missile may not be exposed to temperatures below 30° F for periods exceeding the limits listed below:

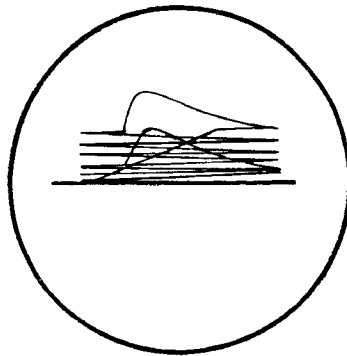
<i>Temperature</i>	<i>Time</i>
25°F	2 hours, 48 minutes
15°F	2 hours, 12 minutes
0°F	1 hour, 40 minutes
-15°F	1 hour, 6 minutes
-25°F	1 hour
-40°F	50 minutes

<sup>2</sup> Hydraulic oil MIS-10137 is only to be used where missiles must be continuously exposed to temperatures that vary between below +20°F and above +30°F during a 24-hour period.

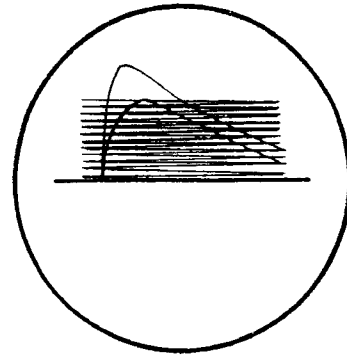
<sup>3</sup> When changing from one type of hydraulic oil to another, insure that all old oil is drained from the APS or HPU.



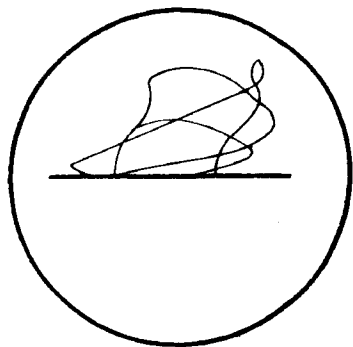
A. ALINEMENT OF MICRO-SECOND OSCILLATOR



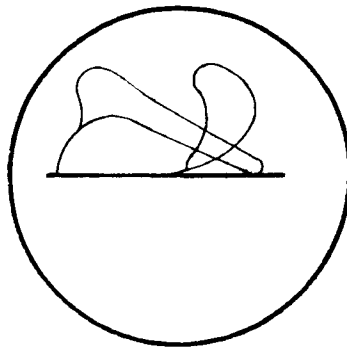
B. ALINEMENT OF SAWTOOTH CIRCUIT-CALIBRATE SWITCH SET TO P AND Y



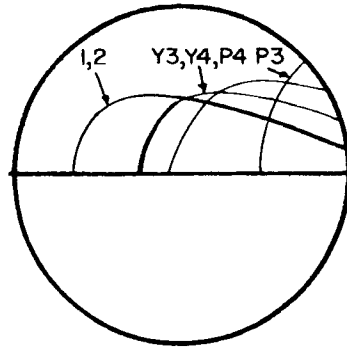
C. ALINEMENT OF SAWTOOTH CIRCUIT-CALIBRATE SWITCH SET TO PITCH



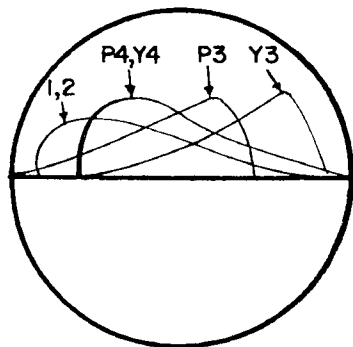
D. ALINEMENT OF D2 DELAY-L1 MISSILE CODE CALIBRATE SWITCH SET TO Y8/#4 RESP. A



E. ALINEMENT OF D2 DELAY-L5 MISSILE CODE CALIBRATE SWITCH SET TO Y8/# RESP. A



F. ALINEMENT OF D2 DELAY-CALIBRATE SWITCH SET TO TRAIN



G. FINAL ALINEMENT OF SAWTOOTH CIRCUIT

ORD G5373

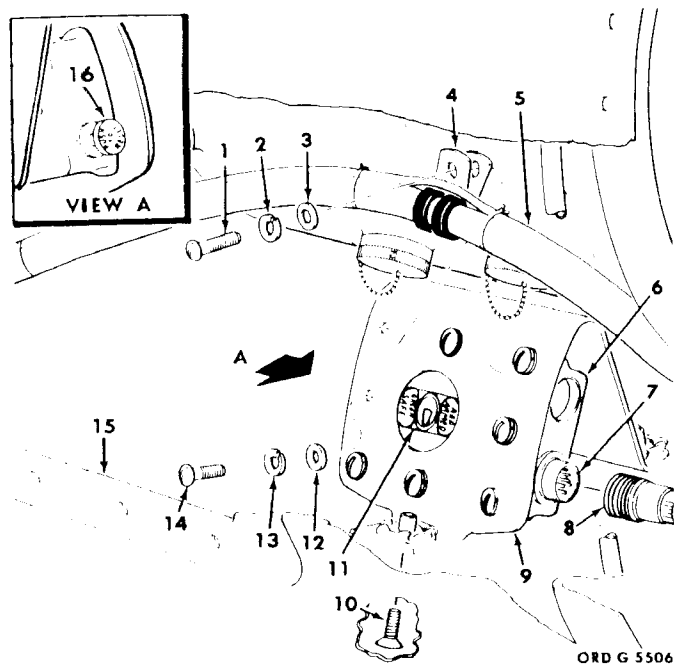
Figure 4-19. Alinement waveforms.

#### 4-13. Check of the Missile Heater Circuits

a. Remove the hexagon-head bolt (11, fig. 3-29) and flat washer (10) that secure the

left side of the forward body section (8) to the testing fixture (5).

**WARNING:** Insure that the self-locking pins (fig. 9.1) are inserted through the lower handling ring segment.



- 1-No. 10-32 x 9/16 truss-hd screw
- 2-No. 10 lockwasher
- 3-0.203 in-id fl washer
- 4-Clamp
- 5-Barometer probe hose and cable
- 6-Safety-and-arming switch S30
- 7-Connector J177
- 8-Connector P177B
- 9-Bracket
- 10-No. 10-32 x 5/8 fl-hd screw (3)
- 11-Inspection window
- 12-0.203 in-id fl washer
- 13-No. 10 lockwasher (2)
- 14-No. 10-32 x 3/8 rd-hd screw (2)
- 15-Forward body section
- 16-PUSH TO RESET switch

Figure 4-20. Removal and installation of safety-and-arming switch S30 (missiles 10206 through 11935).

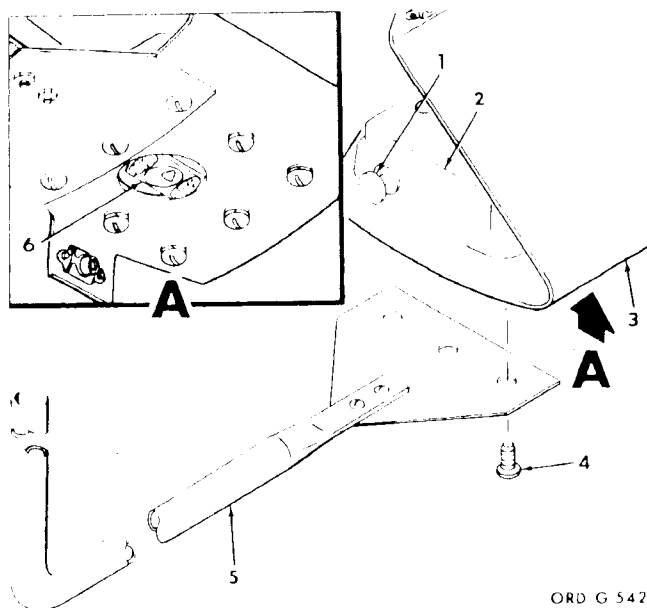
c. Connect connector P171 (2, fig. 4-31) to connector J171 (4) in the rear body section. Make certain that the orange band on connector P171 is visible after the connection is made.

d. Set TEST SELECTOR NO. 1 switch to TRANS. NO. 2.

e. Set TEST SELECTOR NO. 2 switch to HTRS 0A. NULL METER indicates within the white zone.

f. Set TEST SELECTOR NO. 2 switch to HTRS 0B. NULL METER indicates within the white zone.

b. Swing the forward body section to the right until the hinge lock pin (12, fig. 3-29) snaps into the locked position.



- 1-PUSH TO RESET switch
- 2-Safety-and-arming switch S30
- 3-Bracket
- 4-No. 10-32 x 1-3/32 fl-hd screw (3)
- 5-Safety-and-arming switch sling
- 6-Inspection window

Figure 4-21. Removal and installation of safety-and-arming switch S30 from the sling.

g. Set TEST SELECTOR NO. 2 switch to HTRS 0C. NULL METER indicates within the white zone.

h. Disconnect connector P171 from connector J171.

i. Set TEST SELECTOR NO. 2 switch to TRANS. NO. 1 and TEST SELECTOR NO. 1 switch to OFF.

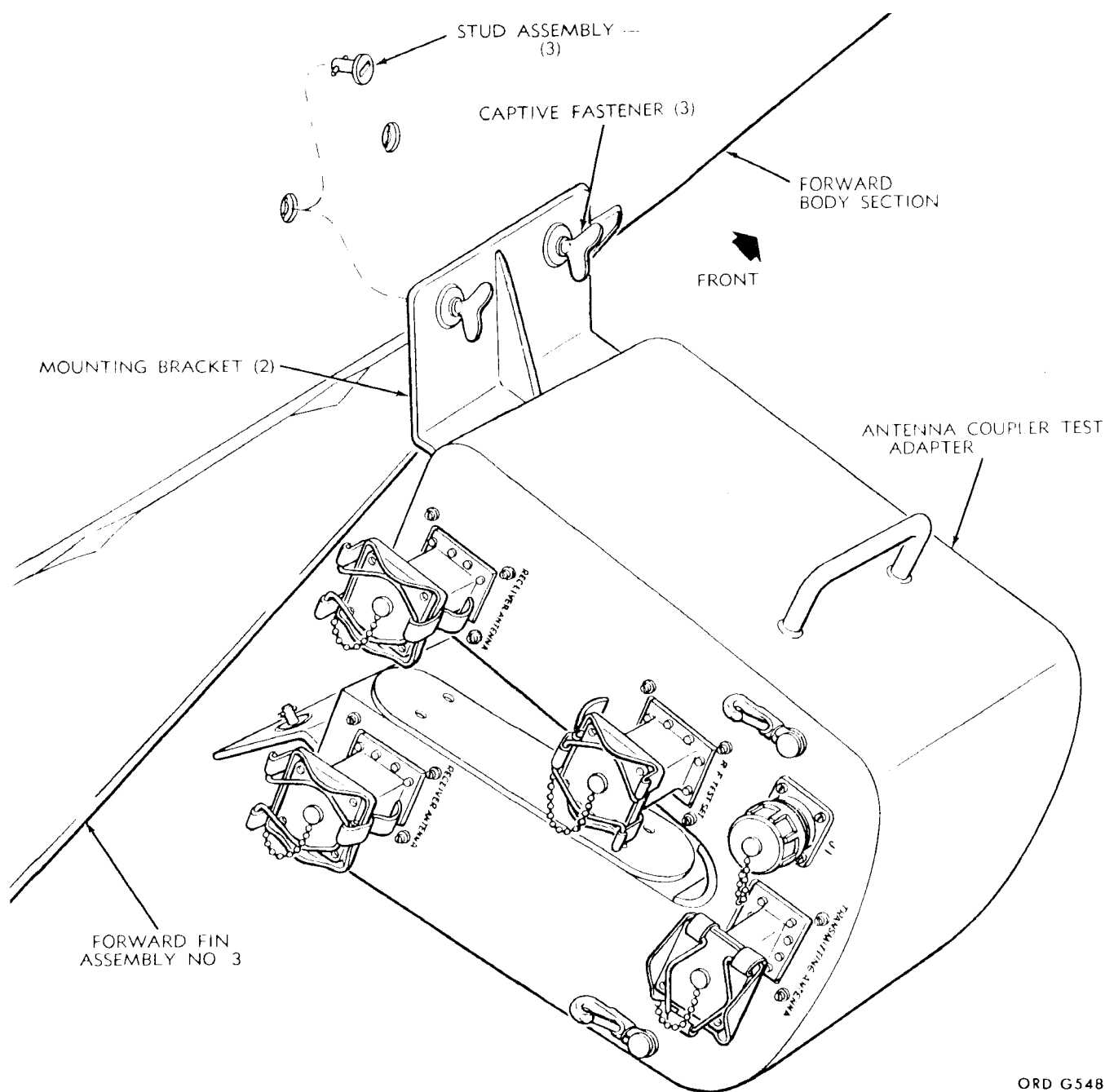
*Note.* Perform steps j and k below for missiles equipped with an APS.

j. At the TCU, set POWER ON switch to OFF. POWER LIGHT extinguishes.

k. At the TPCU, set AC POWER switch to OFF. POWER ON light extinguishes.

#### 4-14. Check of the HPU Squib Battery Activation Circuit

**CAUTION:** Verify that P544 has been disconnected from the HPU squib battery and that the missile and warhead batteries have not been connected.



ORD G5480

Figure 4-22. Removal and installation of the antenna coupler test adapter.

a. Prepare the multimeter to read 250 volts ac.

b. Place a multimeter across pins C and E of connector P544.

b.1. Set the AC POWER switch to ON.

b.2. Set the HEATERS EXTERNAL and PLATE POWER EXTERNAL switches to ON.

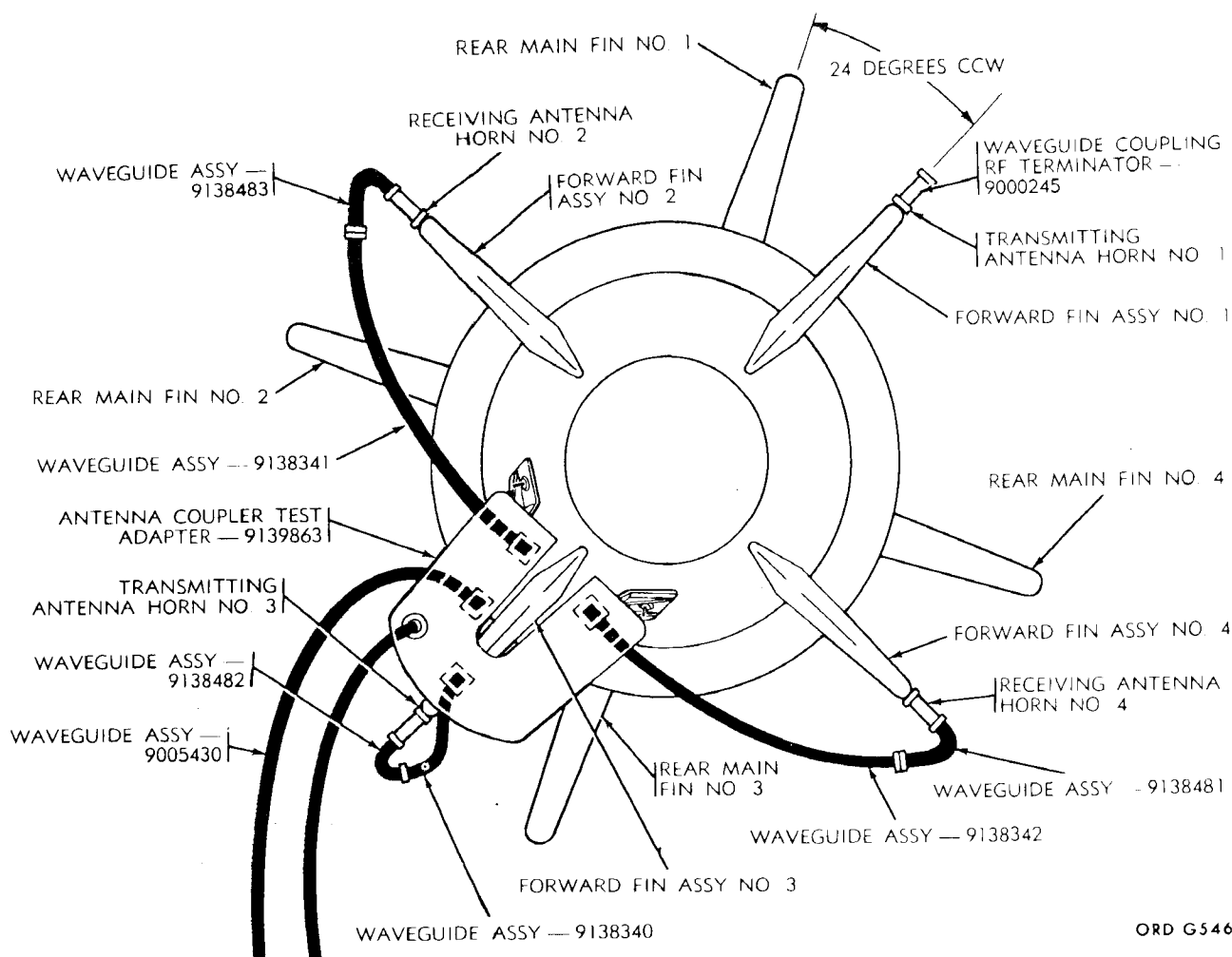
c. Operate the GLOW COIL switch to ON and the AUXILIARY POWER SUPPLY

switch to START. The multimeter must indicate approximately 120 volts ac. (If MWO 9-4935-252-50/2/28 has not been applied, any ac indication is acceptable).

d. Release AUXILIARY POWER SUPPLY switch, and operate the GLOW COIL switch to OFF.

e. Set PLATE POWER EXTERNAL and HEATERS EXTERNAL switches to OFF.

f. Set AC POWER switch to OFF.



ORD G5464

Figure 4-23. Removal and installation of the waveguide assemblies.

g. Remove the cooling unit and associated equipment.

#### 4-15. Transponder Control Group Air Leakage Test

**WARNING:** Do not test the transponder control group for air leakage unless the forward body section (8, fig. 3-29) is swung fully open and the hinge lock pin (12) is in the locked position. If the testing fixture (5) is not available, remove the forward body section, and perform the air leakage test with the forward body section on the forward body section truck.

*Note.* Perform *a* through *e* below for missiles 13001 and subsequent.

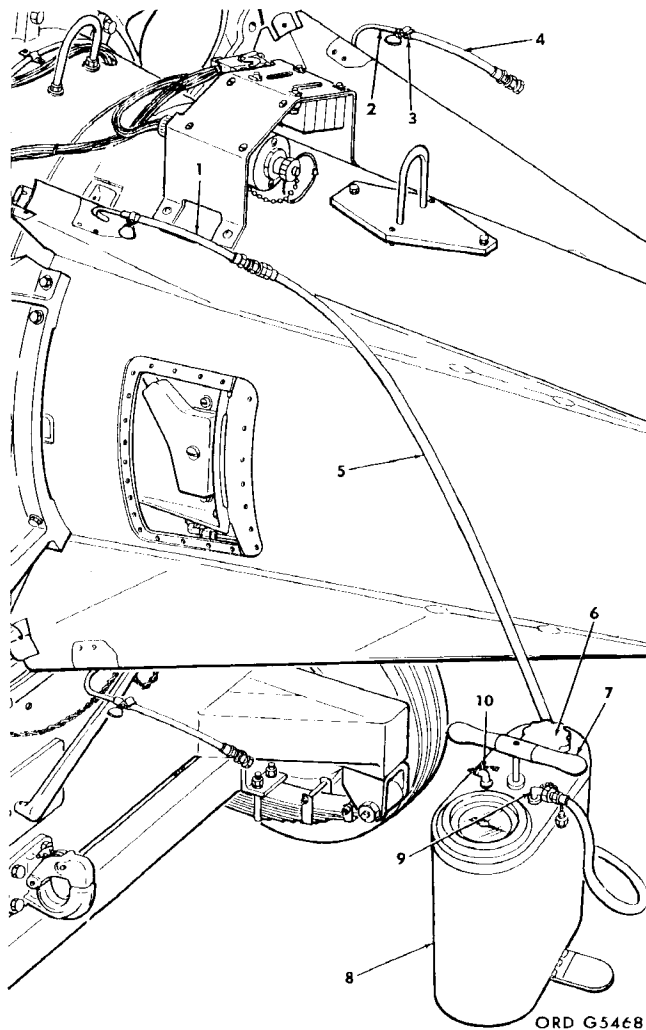
*a.* Loosen the captive screws (3, fig. 12-2) that secure the access cover plate (5) to the transponder control group (1) sufficiently to ensure depletion of the air pressure.

*b.* Remove the rear housing cover (10) and dessicant (17) from the transponder control group as prescribed in steps (1) through (3) below.

(1) Loosen the retaining screw (11), and disengage the lever arm (12).

(2) Exert a steady pull on the two hook handles (23), and remove the rear housing cover from the transponder control group.

(3) Loosen the captive screws (16) that secure the desiccant holder (15) to the inside of the rear housing cover; hinge the desiccant holder and remove the desiccant.



- 1—Adapter hose assy
- 2—Ram-pressure probe (4)
- 3—Hose clamp (4)
- 4—Plug hose assy (3)
- 5—Hose assy
- 6—VAC-OFF-PRESS knob
- 7—Handle
- 8—Stagnation pressure pump
- 9—LINE fitting
- 10—VENT fitting

Figure 4-24. Removal and installation of the pressure fittings.

c. Install activated desiccant, and install the rear housing cover from the transponder con-

trol group as prescribed in steps (1) through (7) below.

**CAUTION:** Do not use any type of tool on the rear housing cover to assist seating.

(1) Remove the performed packing (24) from the packing seat in the rear housing cover (10). Clean the preformed packing, preformed packing seat, and metal sealing surface of the housing with a clean, dry cloth saturated with toluene 6810-281-2002. Apply a thin coat of silicone compound MIL-S-8660 to the preformed packing, preformed packing seat, and metal sealing surface. Place the preformed packing in the preformed packing seat.

(2) (Deleted)

(3) With the pressure valve (7) on the right, seat the rear housing cover on the transponder control group until the retaining ring (14) is approximately flush with the rim of the housing.

(4) Apply pressure to the right hook handle (23) while maintaining a retaining pressure on the left handle. When the rear housing has seated on the right side, hold a retaining pressure on the right hook handle, and increase the pressure on the left handle until the rear housing cover (10) seats on the left side.

(5) Press firmly all sides of the rear housing cover and on each side of the lever arm (12) to insure proper seating.

**CAUTION:** Do not force the lever arm which should close freely to approximately three-eighths of an inch. If force is required to engage the lever arm, the rear housing cover is not properly seated.

(6) Engage the lever arm (12), and tighten the retaining screw (11) to secure the rear housing cover (10) to the transponder control group (1).

(7) Inspect the entire retaining ring (14) for proper seating.

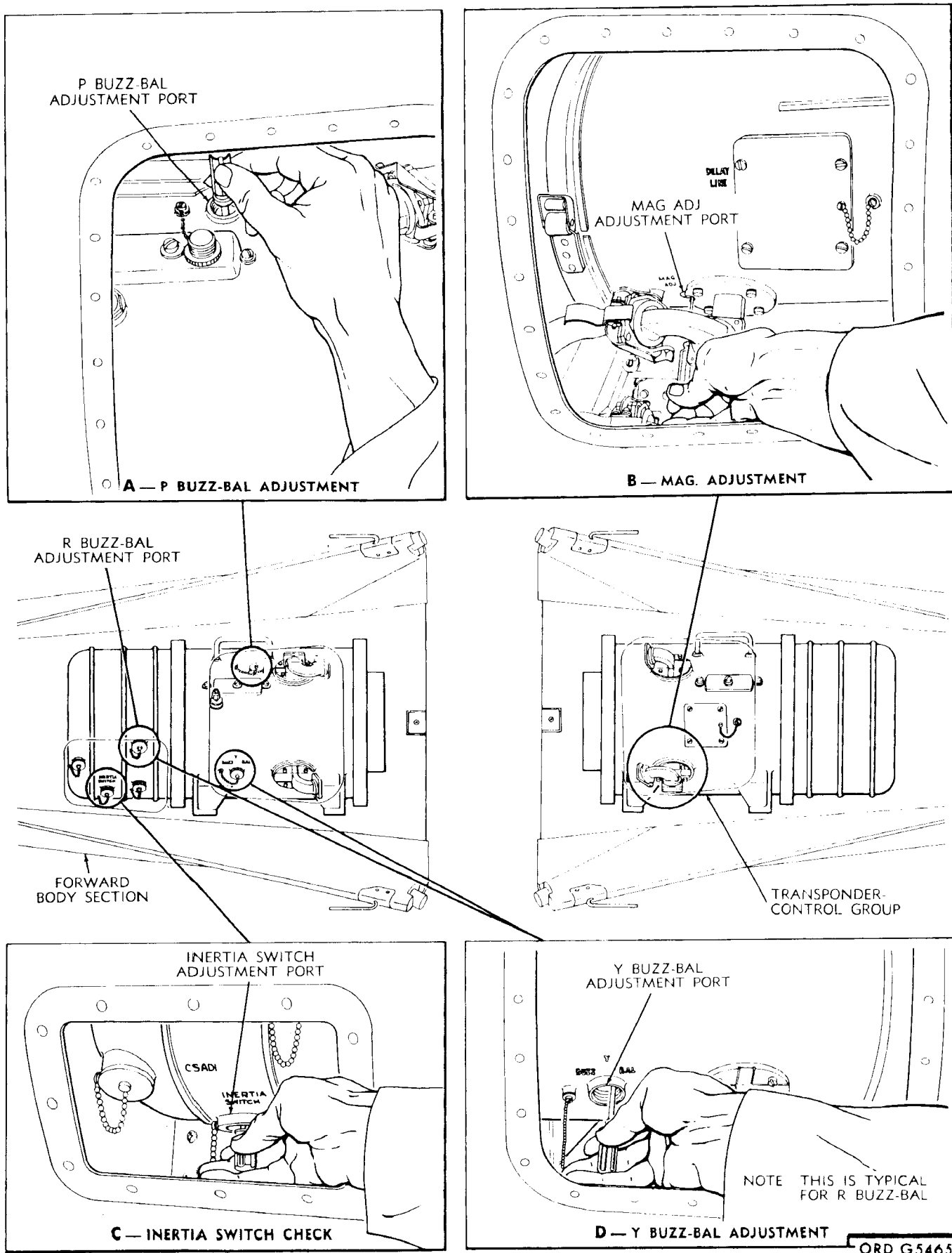
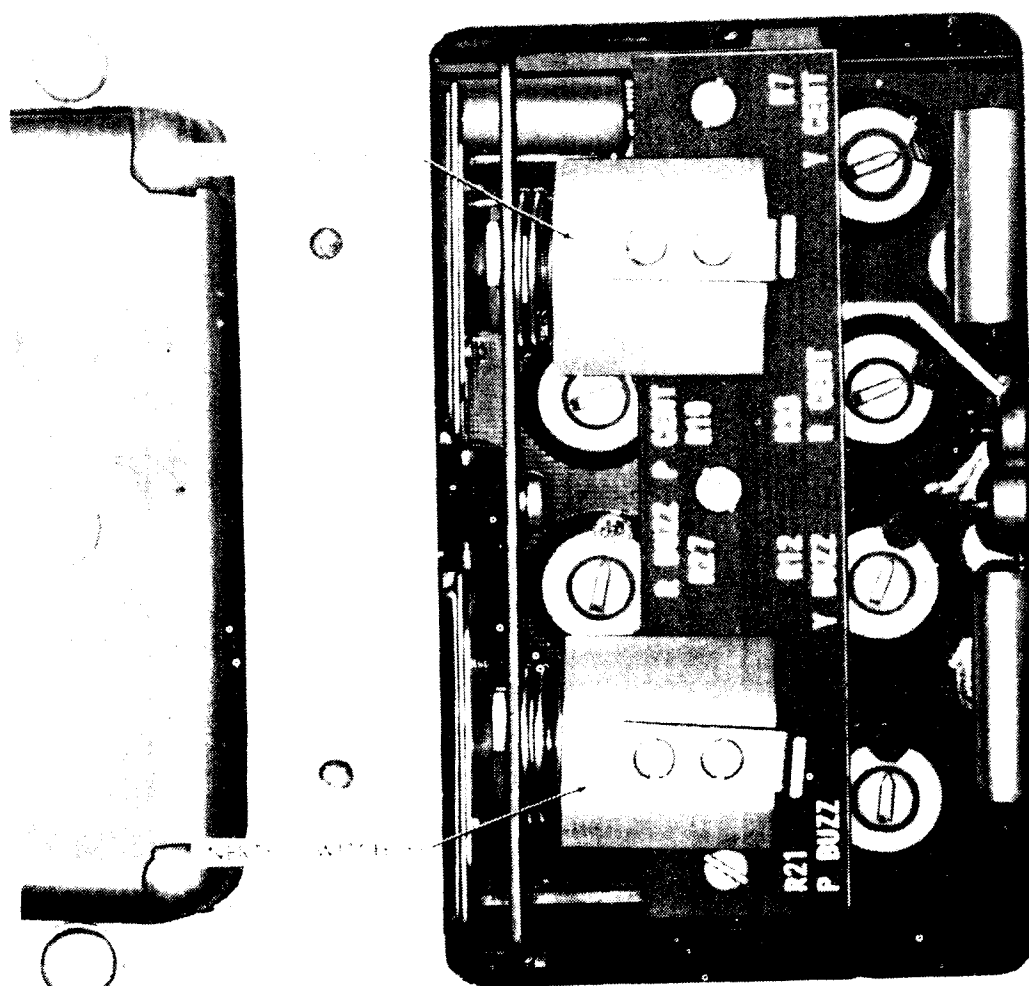


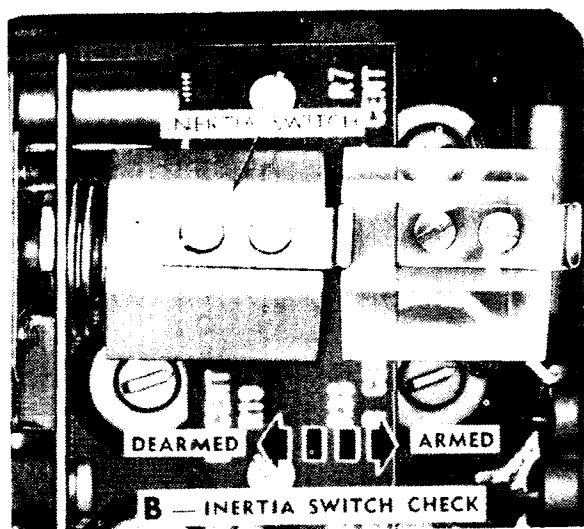
Figure 4-25. Transponder control group adjustments (missiles 10206 through 11935).



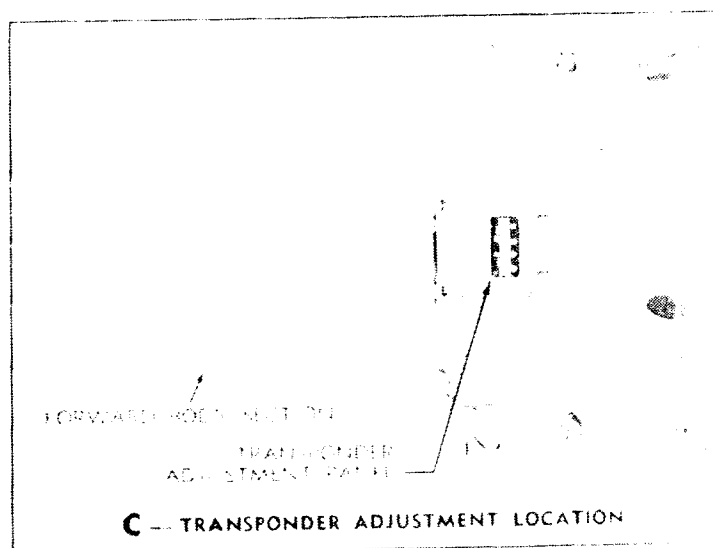


J2

A — TRANSPONDER ADJUSTMENT PANEL



B — INERTIA SWITCH CHECK



C — TRANSPONDER ADJUSTMENT LOCATION

Figure 4-26. Transponder control group adjustments (missiles 13001 and subsequent).

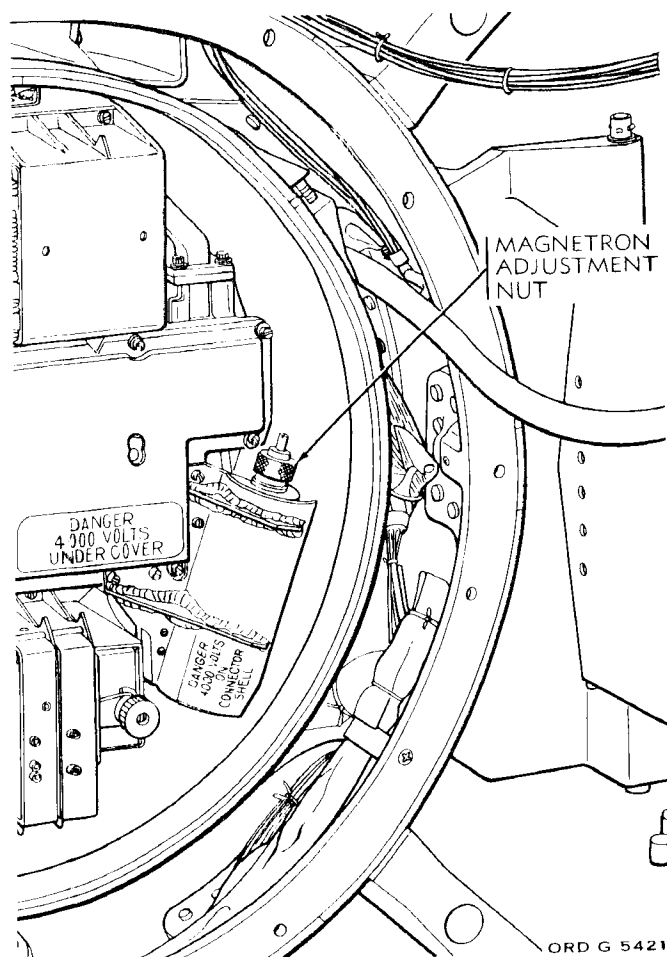


Figure 4-27. Magnetron adjustment (missiles 13001 and subsequent).

d. Tighten the six captive screws (3) that secure the access cover plate (5) to the transponder control group (1).

e. Place the shipping support channel (fig. 4-32) on the forward body section, with the attach holes at the 1- and 7-o'clock positions. Secure with the hexagon-head screws, flat washers, and hexagon nuts.

**CAUTION:** Use a clean, dry air or nitrogen source only.

f. Connect the hose assembly from the INLET connector on the air leakage test set to a compressed air or nitrogen source (200-psi maximum).

g. Connect the hose assembly from the OUTLET connector on the air leakage test

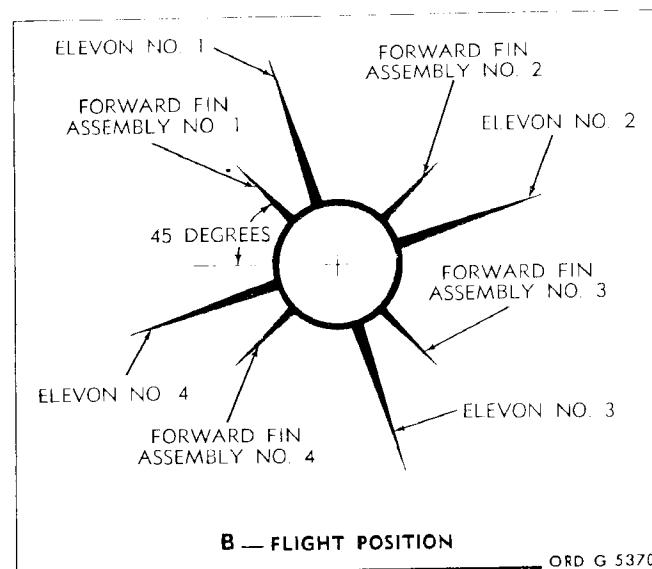
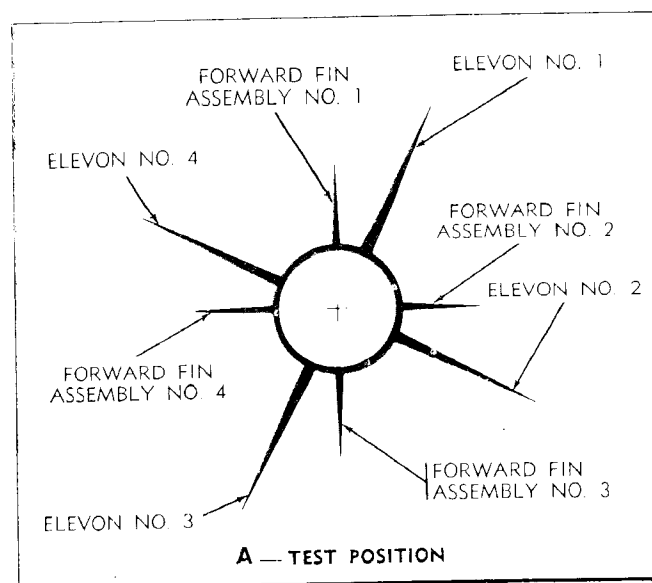


Figure 4-28. Missile positions for missile electrical checkout.

set to the AIR FILLER VALVE on the transponder control group.

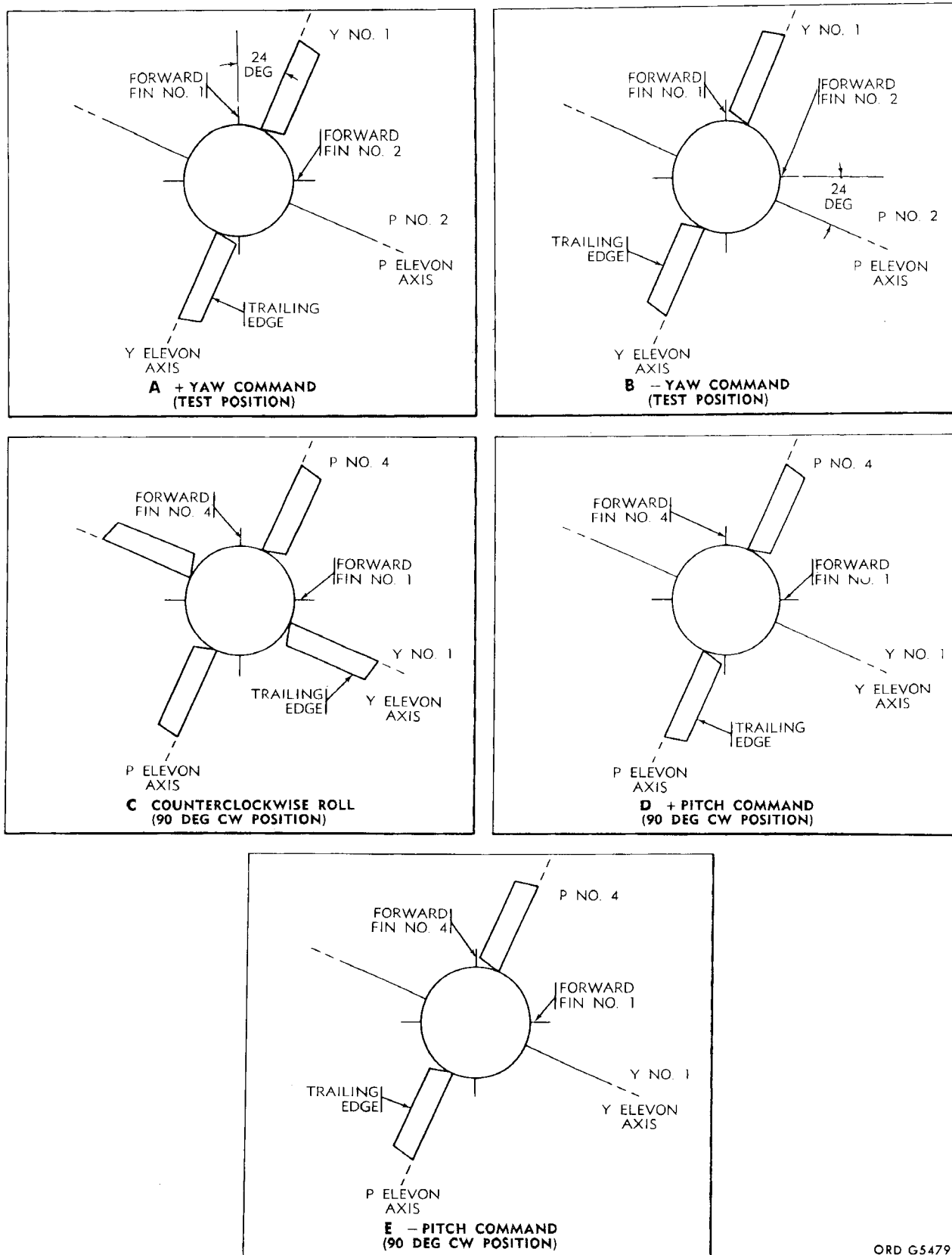
**WARNING:** While performing *h* through *l* below, insure that there are no personnel in direct line with the rear cover of the transponder control group (missile 13001 and subsequent).

*h.* Turn the valve on the air leakage test set counterclockwise until the gage indicates 16 to 20 psi; turn the valve fully clockwise.

*i.* After 3 minutes, check the pressure indication on the gage. The pressure loss is 1 psi

or less. If the pressure loss is in excess of 1 psi, check for proper installation of the screw-type access plugs (fig. 4-1) (missiles 10206 through 11935) or the access cover plate and

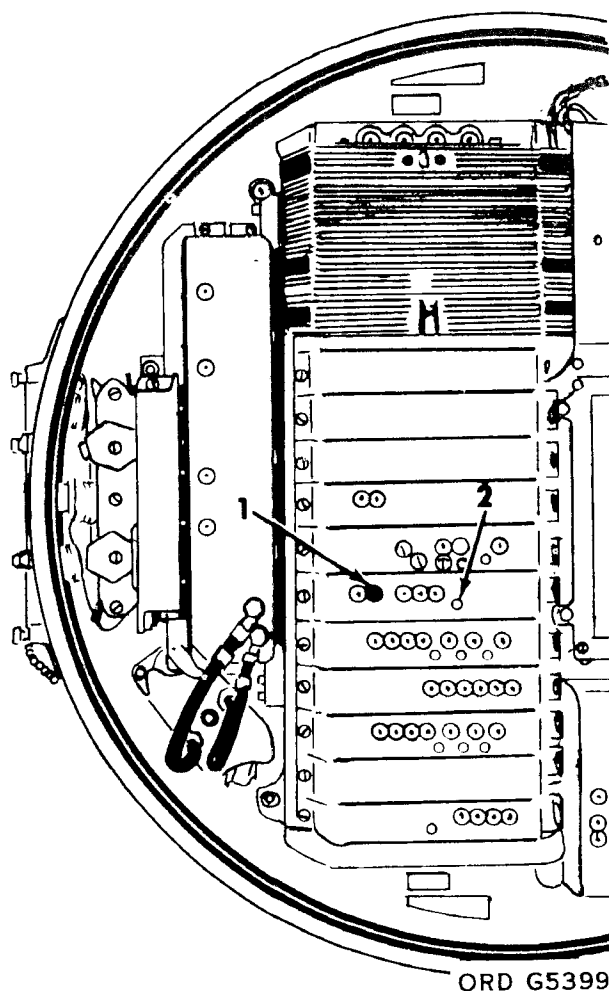
rear housing cover (5 and 10, fig. 12-2) (missiles 13001 and subsequent) on the transponder control group, and repeat *h* above and *i*.



ORD G5479

Figure 4-29. Test commands and resulting elevon displacements.





1—Pulse delay oscillator  
2—Delay time variable resistor R13

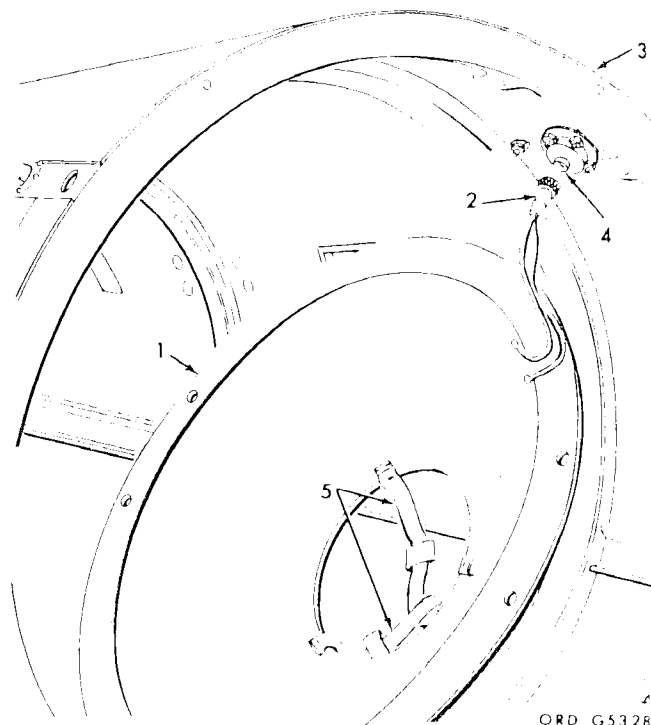
Figure 4-30. Pulse delay oscillator adjustment.

j. Turn the valve to OFF at the compressed air or nitrogen source, and disconnect the hose from the INLET connector and from the source.

k. Disconnect the hose assembly from the OUTLET connector on the air leakage test set, and allow the transponder control group pressure to deplete through the hose. When the pressure is depleted, disconnect the hose from the transponder control group.

l. If MWO ORD Y77-W45 and MWO ORD Y77-W46 have been applied, depress the air-release pushbutton. Depress the valve on the cover plate to insure that the air is depleted (missile 13001 and subsequent).

m. Remove the shipping support channel (missiles 13001 and subsequent).



1—Missile motor head heater  
2—Connector P171  
3—Rear body section  
4—Connector J171  
5—Tape

Figure 4-31. Disconnection, and connection of the motor head heater.

n. Swing the forward body section to the left until the hinge lock pin (12, fig. 3-29) snaps into the locked position.

o. Install the hexagon-head bolt and flat washer to secure the left side of the forward body section to the testing fixture.

#### 4-16. Removal of the Test Equipment

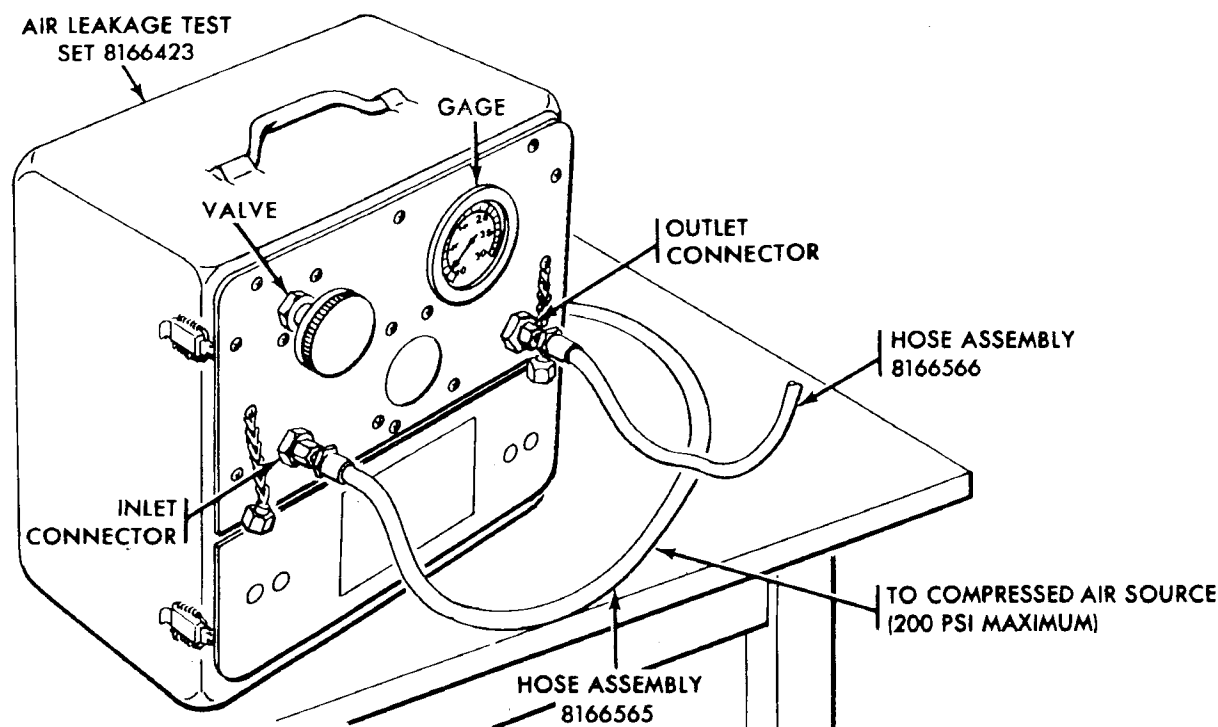
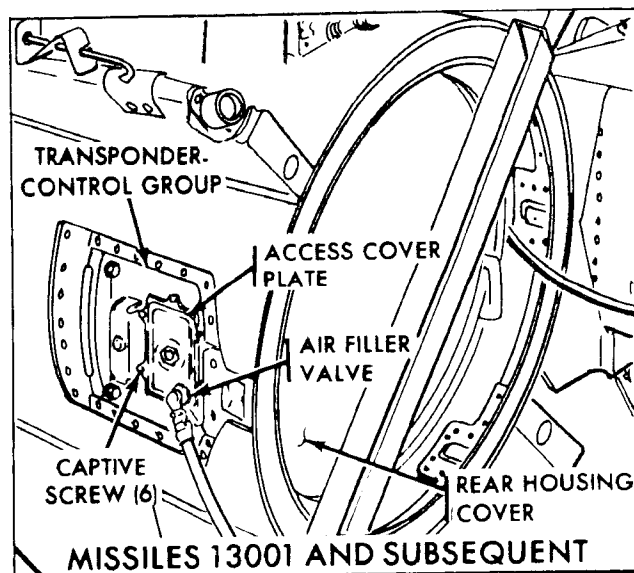
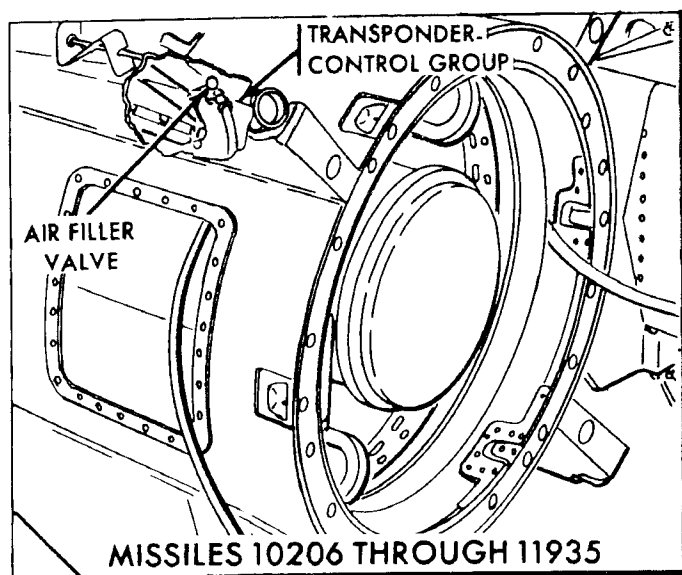
*Note.* Perform the procedure in *a* through *d* below only for missiles equipped with an HPU.

a. Remove all cables and test equipment except the testing fixture.

b. Install the three stud assemblies (fig. 4-22) in the forward body section.

c. Install the motor section, actuator section, and equipment section access doors.

d. Install a closure (6, fig. 3-31) on each ram-pressure probe.



ORD G5400

Figure 4-32. Air leakage test of the transponder control group.

#### Section IV. FUEL SERVICING AND OPERATIONAL TEST (HOT-RUN) OF THE ACCESSORY POWER SUPPLY (APS)

##### 4-17. General

The missile must not be stored for a period longer than 12 months with ethylene oxide ( $ET_hO$ ) in the tank. When recapping the APS fuel tank (refueling after a hot-run), it is not necessary to drain the APS fuel tank.

**WARNING:** The fuel servicing procedure must be performed outside the assembly

building, but not necessarily in a revetted area.

##### 4-18. Servicing and Test Equipment

The servicing and test equipment necessary for the fuel fill and operational test (hot-run) of the APS is listed below:

- a. The  $ET_hO$  fuel tank and fuel tank cart complete with the drain valve, drain

hose, fuel transfer hose with a static ground lead attached, and fuel fill hose with a static ground lead attached.

b. The nitrogen tank, nitrogen tank cart, and regulator valve with the nitrogen sup-

ply hose.

c. One 2-1/2-gallon (minimum) container at least half filled with water.

d. The missile electrical test set group.

e. An APS exhaust assembly.

Table 4-13. Fuel Servicing and Operational Test (HOT RUN) of the Accessory Power Supply (APS)

Step	Operation	Normal indication	Corrective procedure
1	<p>Perform the APS fuel fill.</p> <p><b>WARNING:</b> <math>\text{ET}_h\text{O}</math> liquid and vapor cause severe burns if allowed to become confined between the skin and clothing. Exercise care to keep the <math>\text{ET}_h\text{O}</math> from dropping on or into the shoes or clothing. Should the <math>\text{ET}_h\text{O}</math> become confined between the skin and clothing, remove the clothing, and immediately wash the skin with soap and water, and allow the clothing to air dry for several hours. Dispose of contaminated shoes. Should <math>\text{ET}_h\text{O}</math> get into the eyes, flush the eyes with water, and report to the proper authorities.</p> <p><b>WARNING:</b> The maximum allowable concentration of <math>\text{ET}_h\text{O}</math> vapor is 50 parts of <math>\text{ET}_h\text{O}</math> per million parts of air, for an 8-hour exposure. Where high vapor concentrations exist, and when working is confined to un-ventilated areas, an approved type self-contained breathing apparatus must be worn.</p> <p><b>WARNING:</b> Clear the testing area of all nonparticipating personnel and flammable materials. Position two manned <math>\text{CO}_2</math> fire extinguishers within 4 feet of the APS, and prohibit smoking within 60 feet. Operating personnel must wear goggles or a face mask, rubber gloves, and a rubber apron.</p> <p><b>WARNING:</b> Small quantities of unserviceable <math>\text{ET}_h\text{O}</math> should be disposed of by burning in accordance with applicable instructions or by diluting with a minimum of 22 parts of water to each part of <math>\text{ET}_h\text{O}</math> and dumping into a sanitary sewer or into a fast moving stream of water.</p> <p><b>WARNING:</b> During the fuel servicing and operational test (hot-run) procedures, the missile body must be grounded.</p> <p>a. Perform the arm safety check (par. 4-6).</p> <p>b. Vent the fuel reservoir as prescribed below.</p> <p>(1) Place the end of the fuel drain hose (fig. 11-2) into a 2-1/2-gallon (minimum) container at least half-filled with water. Do not submerge the end of the hose.</p> <p>(2) Depress and hold TRANSFER valve for 25 seconds.</p> <p>(3) Connect the static ground lead, attached to the end of the fuel transfer hose, to the APS service panel wherever a satisfactory ground connection can be made.</p> <p>(4) Connect the fuel transfer hose to FUEL FILL fitting on the APS service panel.</p> <p>(5) Turn the drain valve on the fuel tank cart counterclockwise.</p> <p>(6) Set the external drive motor switch (fig. 4-9) to ON. When ACC. AIR PRESS. gage (fig. 4-7) indicates 2,500 to 3,000 psi, set the external drive motor switch to OFF.</p> <p>(7) Remove the fuel transfer hose (fig. 4-33) from FUEL FILL fitting on the APS service panel.</p> <p>c. Connect the nitrogen supply hose (fig. 4-33) to the supply valve on the <math>\text{ET}_h\text{O}</math> fuel tank.</p> <p>d. Turn the tank valve on the nitrogen tank fully counterclockwise. Turn the regulator valve on the nitrogen tank clockwise until the regulator pressure gage indicates 200 psi.</p> <p><b>WARNING:</b> Direct the bleeder valve away from operating personnel.</p> <p>e. Open the supply valve on the <math>\text{ET}_h\text{O}</math> tank. Open the bleeder valve on the fuel transfer hose until the air is exhausted, and clear <math>\text{ET}_h\text{O}</math> flows from the bleeder valve. Immediately close the bleeder valve.</p> <p>f. Close the supply valve on the <math>\text{ET}_h\text{O}</math> fuel tank.</p> <p>g. Set AC POWER switch on the TPCU to ON. POWER ON indicator light illuminates.</p> <p>h. Set HEATERS EXTERNAL switch to ON. HEATER EXTERNAL indicator light illuminates.</p> <p>i. Operate AUXILIARY POWER SUPPLY switch to START, and hold for a minimum of 1 second and a maximum of 2 seconds.</p> <p>j. Set HEATERS EXTERNAL switch to OFF. HEATERS EXTERNAL indicator light extinguishes.</p> <p>k. Set AC POWER switch on the TPCU to OFF.</p>		



Table 4-13. Fuel servicing and Operational Test (HOT RUN) of the Accessory Power Supply (APS)—Continued

Step	Operation	Normal indication	Corrective procedure
1		POWER ON indicator light extinguishes.	
Cont	<p><i>l.</i> Depress TRANSFER valve on the APS service panel, and hold until ACC. AIR PRESS gage needle ceases to move, then release TRANSFER VALVE.</p> <p><i>m.</i> Connect the static ground lead (fig. 4-33), attached to the end of the fuel transfer hose, to the APS service panel wherever a satisfactory ground connection can be made.</p> <p><i>n.</i> Connect the fuel transfer hose to FUEL FILL fitting by pushing the quick-disconnect fitting securely in place.</p> <p><i>o.</i> Turn the supply valve on the ET<sub>h</sub>O fuel tank fully counterclockwise.</p> <p><i>p.</i> Depress and hold TRANSFER valve on the APS service panel. FUEL LEVEL indicator moves to FULL area.</p> <p><i>q.</i> When the ET<sub>h</sub>O stops flowing through the fuel transfer hose, after one minute, release TRANSFER valve.</p> <p><i>Note.</i> If the fueling operations cannot be performed at 200 psi, the pressure may be adjusted to 240 psi.</p> <p><i>r.</i> Turn the supply valve on the ET<sub>h</sub>O fuel tank fully clockwise.</p> <p><i>s.</i> Turn the regulator valve on the nitrogen tank fully counterclockwise.</p> <p><i>t.</i> Turn the tank valve on the nitrogen tank fully clockwise.</p> <p><i>u.</i> Disconnect the fuel transfer hose from FUEL FILL fitting on the APS service panel. Disconnect the static ground lead from the APS service panel, and place the fuel transfer hose on the fuel tank cart.</p> <p><i>v.</i> Disconnect the nitrogen supply hose from the supply valve on the ET<sub>h</sub>O fuel tank.</p> <p><i>w.</i> Set AC POWER switch on the TPCU to ON. POWER ON indicator light illuminates.</p> <p><i>x.</i> Set HEATERS EXTERNAL switch to ON. HEATERS EXTERNAL indicator light illuminates.</p> <p><i>y.</i> Operate AUXILIARY POWER SUPPLY switch to STOP, and hold for approximately 1 second and a maximum of 2 seconds.</p> <p><i>z.</i> Set HEATERS EXTERNAL switch to OFF. HEATERS EXTERNAL indicator light extinguishes.</p> <p><i>aa.</i> Set AC POWER switch on the TPCU to OFF. POWER ON indicator light extinguishes.</p> <p><i>ab.</i> Set the external drive motor switch to ON. When ACC. AIR PRESS. gage reaches maximum pressure between 2,500 and 3,000 psi, set the external drive motor switch to OFF. If ACC. AIR PRES. gage indication exceeds 3,000 psi, perform the procedures prescribed in table 4-2, step 87(1) through (11) or table 4-3, step 64(1) through (11).</p> <p><i>ac.</i> Observe that FUEL LEVEL indicator (fig. 4-33) remains within FULL area. If FUEL LEVEL indicator has moved into the REFILL area, repeat the APS fuel-fill procedures as prescribed in <i>d</i> through <i>ab</i> above and <i>ac</i>; use 240 psi while performing <i>d</i> above. If, after performing the fueling operations using 240 psi, FUEL LEVEL indicator does not remain in full area, defuel the APS (chapter 11, section X), and repeat the APS fuel fill procedure.</p> <p><i>ad.</i> Observe HYD. RES. LEVEL indicator (fig. 4-33). If the indicator indicates the ambient temperature <math>\pm 25^{\circ}\text{F}</math>, the system is balanced correctly.</p>		

Table 4-13. Fuel Servicing and Operating Test (HOT RUN) of the Accessory  
Power Supply (APS)—Continued

Step	Operation	Normal indication	Corrective procedure
1 ■ Cont			<p>If the indication is above the ambient temperature <math>\pm 25^{\circ}\text{F}</math>. Install the oil drain line and open the OIL BLEED valve until the HYD. RES. LEVEL indicator indicates the ambient temperature.</p> <p>Close the OIL BLEED valve. If the indication is below ambient temperature <math>-25^{\circ}\text{F}</math>, perform the steps below.</p> <ol style="list-style-type: none"> <li>(1) Perform the arm safety check (par. 4-6).</li> <li>(2) Set the AC POWER switch on the TPCU to ON.</li> <li>(3) Set the POWER switch on the TCU to ON.</li> <li>(4) Set the POWER switch on the cooling unit to ON.</li> <li>(5) Set the HEATERS EXTERNAL switch to ON.</li> <li>(6) After approximately 30 seconds, operate AUXILIARY POWER SUPPLY switch to START, and hold for a minimum of 1 second and a maximum of 2 seconds.</li> <li>(7) Depress and hold the TRANSFER valve until ACC. AIR PRESS. gage indicates the ambient temperature.</li> <li>(8) Operate AUXILIARY POWER SUPPLY switch to STOP, and hold for a minimum of 1 second and a maximum of 2 seconds.</li> <li>(9) Set the HEATERS EXTERNAL switch to OFF.</li> <li>(10) Set the POWER switch on the cooling unit to OFF.</li> </ol>

*Table 4-13. Fuel Servicing and Operational Test (HOT RUN) of the  
Accessory Power Supply (APS)—Continued*

<i>Step</i>	<i>Operation</i>	<i>Normal indication</i>	<i>Corrective procedure</i>
1 Cont			<p>(11) Set the AC POWER switch on the TPCU to OFF.</p> <p>(12) Perform the procedures prescribed in table 4-2, steps 21, 22, 79 through 82 or table 4-2, steps 21, 22, 79, through 82 or table 4-3, steps 20 through 26. Repeat <i>ad</i> above.</p> <p>(13) Turn the BY-PASS valve on the portable oil fill and filter unit or the hydraulic test stand fully counterclockwise.</p> <p>(14) Set or depress the STOP switch on the hydraulic test stand.</p> <p>(15) Disconnect the hydraulic oil supply hose (C, fig. 4-11) from the OIL FILL fitting.</p> <p>(16) Perform procedures as prescribed in steps (2) through (5) above and paragraphs <i>y</i> through <i>aa</i> above.</p> <p>(17) Slowly open the OIL BLEED valve until the HYD. RES. LEVEL indicator indicates the ambient temperature. Close the OIL BLEED valve.</p> <p>(18) Remove the drain hose from the overboard dump tube.</p>
2	<p><i>ae.</i> Remove the external drive motor (1, fig. 4-8), and install the turbine shaft cap (6) and gasket (5). Tighten to a torque value of 60 pound-inches.</p> <p>Perform the operational test (HOT RUN) of the APS.</p> <p><b>WARNING: Restrict the APS operational test (hot-run) to the authorized test area. Place two manned CO<sub>2</sub> fire extinguishers within 4 feet of the APS. Prohibit smoking within 60 feet of the test area.</b></p> <p><i>Note.</i> Check that the right equipment section access cover plate (2, fig. 3-21) has been removed before performing the hot-run.</p>		

*Table 4-13. Fuel Servicing and Operational Test (HOT RUN) of the Accessory  
Power Supply (APS)—Continued*

<i>Step</i>	<i>Operation</i>	<i>Normal indication</i>	<i>Corrective procedure</i>
<b>2</b> <b>Cont</b>	<p>a. Check that the HYD. RES. LEVEL indicator indicates the ambient temperatures <math>\pm 25^{\circ}\text{F}</math>.</p> <p>b. Check that the ACC. AIR PRESS. gage indicates not less than 2,500 psi.</p> <p style="text-align: right;">If the indication is less than 2,500 psi, install the external drive motor (table 4-2 steps 1 through 10), and pressurize the system (table 4-2, step 87).</p> <p>c. Position the exhaust pipe (1, fig. 4-34) over the APS turbine exhaust port, and secure the pipe to the equipment section with the four captive thumbscrews.</p> <p>d. Energize the exhaust blower.</p> <p>e. Pull out the arm SAFETY SWITCH to the maintenance (fully out) position (A, step 3, fig. 4-6).</p> <p>f. Set the AC POWER switch on the TPCU to ON.</p> <p style="text-align: right;">The POWER ON indicator light illuminates.</p> <p>g. Set the POWER switch on TCU to ON.</p> <p style="text-align: right;">The POWER LIGHT illuminates.</p> <p>h. Set the HEATERS EXTERNAL switch to ON.</p> <p style="text-align: right;">The HEATERS EXTERNAL indicator light illuminates.</p> <p>i. Set the GLOW COIL switch to ON.</p> <p>j. Depress the A.P.S. ACCEL. indicator light.</p> <p style="text-align: right;">The A.P.S. ACCEL. indicator light illuminates.</p> <p><i>Note.</i> Step j above is a test only of the A.P.S. ACCEL. indicator light.</p> <p><i>Note.</i> Observe the ACC. AIR PRESS. gage to assure that the pressure does not drop below 2,500 psi during the hot-run.</p> <p><b>WARNING:</b> If the APS does not cycle audibly after performing step k below, operate the AUXILIARY POWER SUPPLY switch to STOP, and hold for a minimum of 2 seconds and a maximum of 5 seconds. If the APS does not stop immediately, set the AC POWER switch on the TPCU to OFF, and immediately evacuate the area. Wait until the fuel is exhausted and the APS has stopped before reentering the area.</p> <p><i>Note.</i> While performing k and l below, the AUXILIARY POWER SUPPLY switch must be held in START and STOP positions as noted instead of the normal minimum of 1 second and maximum of 2 seconds. This is necessary to insure that the relays in the APS control assembly are properly sequenced so that the APS will start and stop properly.</p> <p>k. Forty-five seconds after the GLOW COIL SWITCH is set to ON, operate the AUXILIARY POWER SUPPLY switch to START, and hold for a minimum of 2 seconds and a maximum of 5 seconds.</p> <p style="text-align: right;">The A.P.S. ACCEL. indicator light illuminates, and the APS cycles audibly.</p> <p>l. Set the GLOW COIL switch to OFF.</p> <p><i>Note.</i> In m below, any motion of the ACC. AIR PRESS. gage is acceptable.</p> <p>m. Set the PLATE POWER EXTERNAL switch to ON.</p> <p style="text-align: right;">The PLATE POWER EXTERNAL indicator light illuminates, and the ACC. AIR PRESS gage and the unloader valve cycle.</p>		

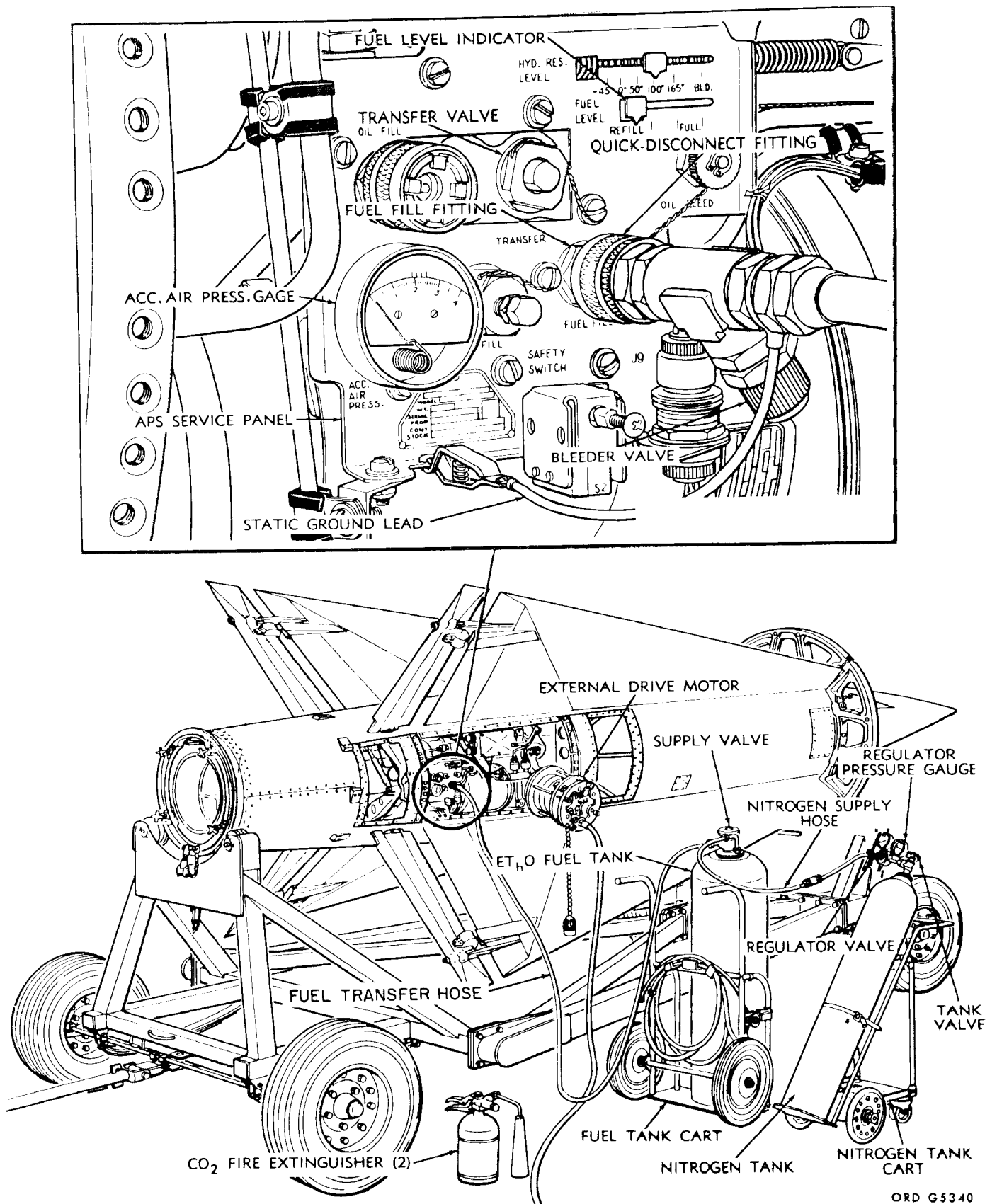
*Table 4-13. Fuel Servicing and Operational Test (HOT RUN) of the Accessory  
Power Supply (APS)—Continued*

<i>Step</i>	<i>Operation</i>	<i>Normal indication</i>	<i>Corrective procedure</i>
1.	n. Set the TEST SELECTOR NO. 1 switch to TRANS NO. 2.		
Cont	o. Depress the YAW pushbutton, and alternately rotate the TEST SELECTOR NO. 2 switch between +G and -G.		
		The Y elevons will deflect to the left on +G and to the right on -G.	
	p. Depress the PITCH pushbutton, and alternately rotate the TEST SELECTOR NO. 2 switch +G and -G.		

Table 4-13. Fuel Servicing and Operational Test (HOT RUN) of the Accessory Power Supply (APS) -- Continued

Step	Operation	Normal indication	Corrective procedure
2 cont	q. Set the TEST SELECTOR NO. 2 switch to TRANS. NO. 1, the TEST SELECTOR NO. 1 switch to GYRO PRESET, and the PRESET-FLIGHT switch to FLIGHT.	The P elevons will deflect to the right on +G and to the left on -G.	
	r. Depress the ROLL pushbutton, and set the ROLL POSITION switch to NORMAL.		
	s. Operate the GYRO PRESET switch to CW or CCW.		
	t. Depress the RESET pushbutton.	All elevons will deflect accordingly.	
	u. Set the PLATE POWER EXTERNAL switch to OFF.	The A.P.S. ACCEL. indicator light extinguishes.	
		The PLATE POWER EXTERNAL indicator light extinguishes.	
	<b>WARNING:</b> If the APS does not stop immediately after performing step v below, set the AC POWER switch on the TPCU to OFF, and immediately evacuate the area. Wait until the fuel is exhausted and the APS has stopped before reentering the area.		
	v. After a minimum of 5 seconds, operate the AUXILIARY POWER SUPPLY switch to STOP, and hold for a minimum of 2 seconds and a maximum of 5 seconds.		
		The APS stops.	
	w. Set the HEATERS EXTERNAL switch to OFF.		
		The HEATERS EXTERNAL indicator light extinguishes.	
	x. Set the POWER ON switch on the TCU to OFF.		
		The POWER LIGHT extinguishes.	
	y. Set the AC POWER switch on the TPCU to OFF.		
		The POWER ON indicator light extinguishes.	
	z. Move the arm SAFETY SWITCH to the center (safe) position (A, step 2, fig. 4-6).		
	aa. Deenergize the exhaust blower.		
	ab. Loosen the four captive thumbscrews, and remove the exhaust pipe.		
	ac. After 30 minutes, visually inspect the APS for fuel and oil leaks.		
	ad. Perform the glow plug continuity check (par. 4-7).		
	<b>CAUTION:</b> Do not cover the exhaust port with tape.		
	ae. Install the plug in the APS turbine exhaust port, or cover the exhaust port with paper, and tape it in place.		
	af. Fuel fill the APS (step 1 above).		
	ag. Remove all cables and test equipment except the testing fixture.		
	<b>WARNING:</b> Before installing the right equipment section access cover plate, make certain the APS exhaust seal is installed under the retaining clips on the cover plate with the exhaust seal flange pointing outward. The exhaust seal must be installed to prevent an explosion hazard caused by the return of turbine exhaust fumes into the rear body section.		
	ah. Install the missile motor section, actuator section, and equipment section access doors. Tighten the screws in the equipment section access door on the right side to the values specified in table 15-9.		
	ai. Install the three stud assemblies (fig. 4-22) in the forward body section.		
	aj. (Deleted)		
	ak. Install a closure (6, fig. 3-31) on each ram-pressure probe.		

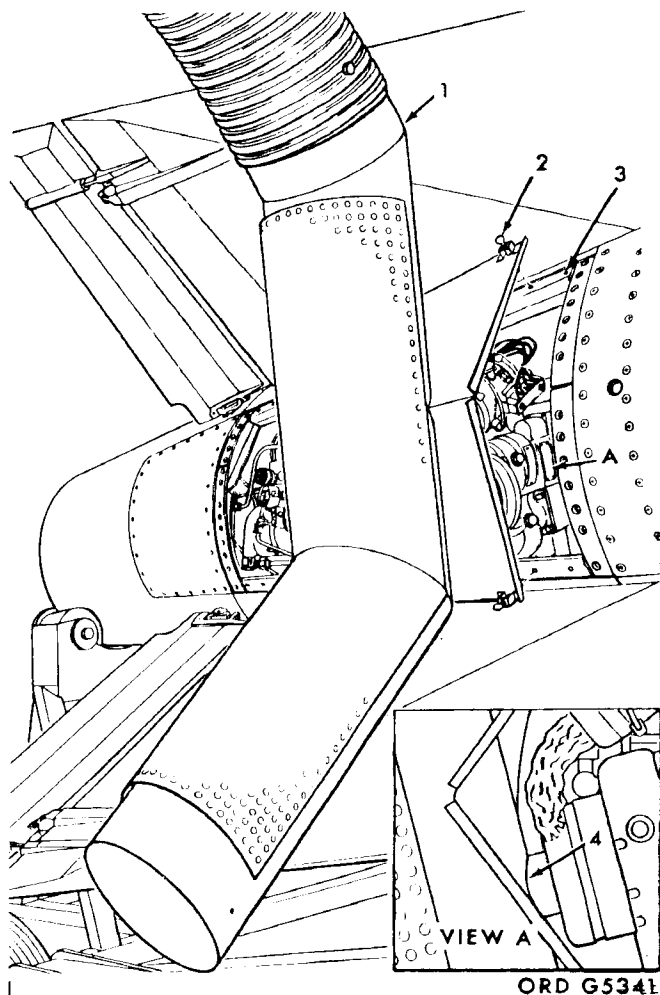




ORD G5340

Figure 4-83. APS fuel fill.





- 1—Exhaust pipe
- 2—Captive thumbscrew (4)
- 3—Equipment section
- 4—APS turbine exhaust port

Figure 4-34. Removal and installation of the exhaust pipe.

#### 4-19. Adjustment of the Arm SAFETY SWITCH

a. Open the APS SERVICE DOOR (fig. 4-35).

**Warning:** When the APS SERVICE DOOR is closed, the APS is in the ready condition. When open or unlatched, the APS is in a safe condition. The APS SERVICE DOOR must be open before the missile is installed on the launcher but closed prior to firing.

b. Place a straight edge horizontally on the

outer surface of the skin, in line with the arm SAFETY SWITCH. Depress the arm SAFETY SWITCH to the armed position (A, step 1, fig. 4-6). There should be a clearance of approximately  $\frac{3}{16}$  inch between the inside edge of the straight edge and the adjustment screw of the arm SAFETY SWITCH. If the clearance is not correct, adjust by holding the shaft of the arm SAFETY SWITCH and turning the adjustment screw until a clearance of approximately  $\frac{3}{16}$  inch is obtained.

c. Close the APS SERVICE DOOR, and listen for the audible click that indicates the arm SAFETY SWITCH has depressed to the armed position (A, step 1, fig. 4-6). Readjust the switch as required to obtain an audible click when the APS SERVICE DOOR is closed.

d. Open the APS SERVICE DOOR.

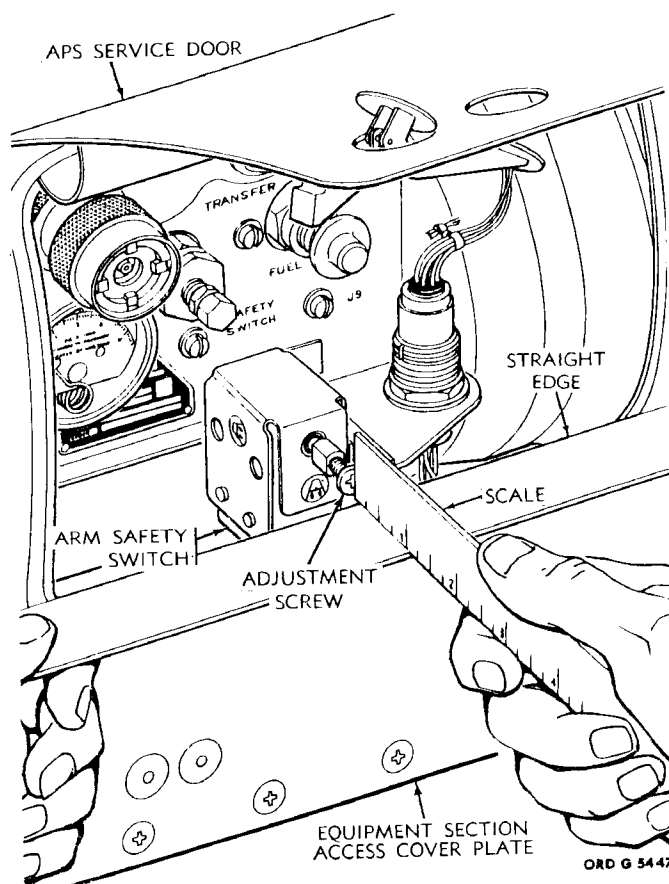


Figure 4-35. Adjustment of the arm SAFETY SWITCH.